# The JOURNAL of GEOGRAPHY

VOLUME L OF MICHIGAN DECEMBER, 1951 NUMBER 9

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## *In This Issue*

"Turning Tows" on the Illinois-Mississippi Waterway . . . . . *J. Edwin Becht*

The Teaching of Hypothetical Maps . . . . . *Linnie B. James*

A Technique for Visual Examination of Associations of Areal Patterns . . . . . *Allen K. Philbrick and Harold M. Mayer*

The Geography of Education . . *Edna E. Eisen*

The Range of Classical Greek Trade . . . . . *Roderick Peattie*

National Council at Work . . *Clyde F. Kohn*

Geographical Publications . . . . . .

Books and Pamphlets Received . . . . . .

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# *The* JOURNAL *of* GEOGRAPHY

CONTENTS FOR DECEMBER, 1951


**"Turning Tows" on the Illinois-Mississippi Waterway. By J. Edwin Becht** ..... 353

Dr. Becht did his undergraduate work at Southern Illinois University and his graduate work at the University of Illinois. He has taught at Bradley University and Southern Illinois University. At the latter institution he was a weather observer in the United States Airway Weather Station. Since taking his doctorate degree at the University of Illinois last June, he has been called back into the Armed Forces in which he served during the Second World War as an observational aviator.

**The Teaching of Hypothetical Maps. By Linnie B. James** ..... 361

Mrs. James, teacher of geography in the Forest Hills Junior High School, Pennsylvania, has contributed several articles to the JOURNAL OF GEOGRAPHY. She is the author of three geography workbooks for junior high school students. Her interest lies in the improvement of teaching techniques.

**A Technique for Visual Examination of Associations of Areal Patterns. By Allen K. Philbrick and Harold M. Mayer** ..... 367

Drs. Philbrick and Mayer are members of the Department of Geography, University of Chicago. This is the second article written especially for college teachers which has appeared in the JOURNAL since September. The first, written by Dr. Calef of the same department, was entitled "Student Mapping of an Area of Multi-Story Buildings" and appeared in the September 1951 issue of the JOURNAL.

**The Geography of Education. By Edna E. Eisen** ..... 374

Dr. Eisen, Professor of Geography, Kent State University, is well-known for the many articles and book reviews which she has published in the JOURNAL OF GEOGRAPHY. This is the second article which deals with educational land use to appear since September.

**The Range of Classical Greek Trade. By Roderick Peattie** ..... 383

Dr. Peattie, Professor of Geography, Ohio State University, is well-known for his numerous books, articles, and book reviews. In the December 1950 issue appeared his article entitled "Are You A Malthusian?"

**National Council at Work. By Clyde F. Kohn** ..... 389

**Geographical Publications** ..... 390

**Books and Pamphlets Received** ..... 392



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VOLUME L DECEMBER, 1951 NUMBER 9

# "TURNING TOWS" ON THE ILLINOIS-MISSISSIPPI WATERWAY

J. EDWIN BECHT
Armed Forces

Differing capacities for accommodating shipping along the Illinois-Mississippi Waterway have resulted in an operating procedure referred to as "turning tows." On the basis of capacity to carry traffic the waterway can be divided into three sections. They are the stretches between 1. Chicago and Joliet, Illinois, 2. Joliet and Peoria, Illinois and 3. Peoria and the Gulf of Mexico. Narrow, crooked, shallow waters and frequent low bridges above Joliet, Illinois, necessitate use of small tow-boats of less than 1200 H.P., the larger having telescoping pilot houses (Fig. 1). In the second a rocky stream bed, a fairly narrow channel (200 feet), and numerous

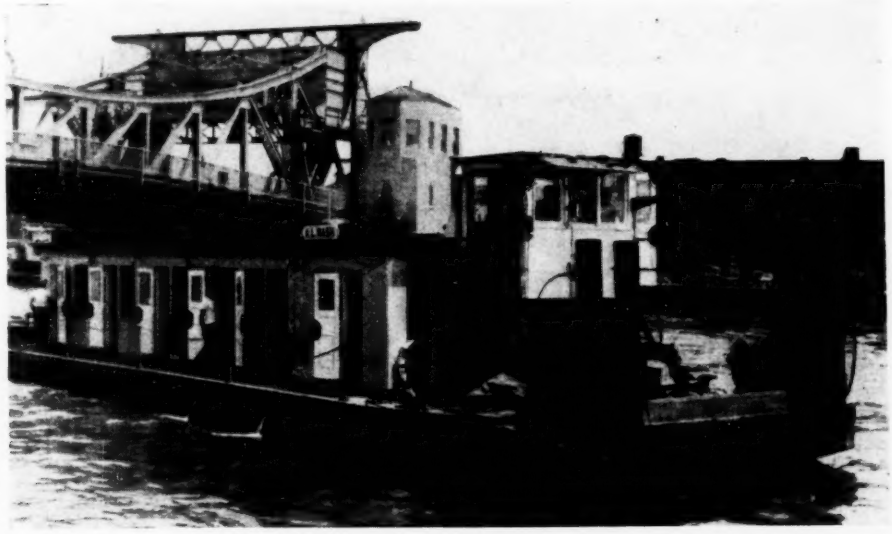


FIG. 1. A. L. Nash "Switcher Towboat" with Hydraulically Operated Pilot House. (Courtesy Marine Transit Co.)

FIG. 2. "Robert W. Lea" 1400 H.P. Diesel Powered Towboat.

locks preclude an efficient use of the most powerful towboats so that craft of approximately 1400 H.P. diesels are typical (Fig. 2). Finally, the largest towboats normally ascend the waterway only to the vicinity of Peoria. Some of these are 3600 H.P. giants, over 160 feet long (Fig. 3).

## SIZES OF TOWBOATS VARY

The larger carriers, those operating fleets of river craft, adjust their operations to these physical limitations in order to derive the greatest possible speed and efficiency from their power units. They arrange for "switcher towboats" to assemble barges in the rivers and canals of Greater Chicago and move them in tows to Joliet. At this point larger "pushers" meet them with barges bound into Chicago and here they exchange tows, this is known as "turning tows"; then, the small towboats return to Chicago with their inbound cargoes and the larger vessels push their newly acquired burden southward. The process is repeated when the largest towboats are encountered, usually somewhere between Cape Girardeau, Missouri, and Peoria, Illinois, as they bring their tows toward or into the Illinois River.

Furthermore, Joliet is a limiting point in that north of this point

tows are restricted to three or four barges in the Sanitary and Ship Canal and to only two or three in the Sag Channel (Fig. 4). On the other hand the average tow south of Joliet consists of eight cargo units. Therefore as northbound tows must be divided, and southbound tows consolidated at Joliet it serves as a logical point for "turning tows."

Towboats do not necessarily meet at an exact location. Rather an accordian-like movement provides a flexibility that allows for delays due to weather, accidents, stage of water or characteristics of the cargo. The towboat pilots actually keep their barges moving until the oncoming tow is encountered and an exchange is then made. On occasion, however, narrow sections of the waterway are avoided. If radio contact has indicated two towboats might rendezvous along an especially disadvantageous part of the route one of the towboats will wait at a more convenient point.

Furthermore, not all companies operate alike. No provision is made for "turning" small petroleum tows, nor do grain and sand towboats, making a short haul from Illinois points to Chicago necessarily "turn tows." Likewise coal loads are usually divided but once, at Brandon Pool. For the most part, however, carriers traveling the longer-haul, to New Orleans or to Pittsburgh, do practice a double "turning of tows."

Following one of these tows from its assembling in Chicago until

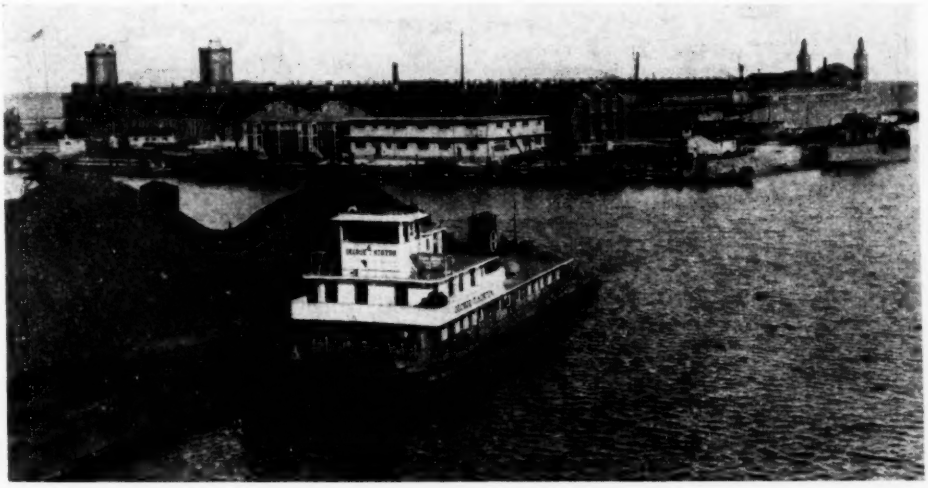


FIG. 3. "George T. Horton" 3600 H.P. Diesel Powered Towboat Used on the Lower Illinois and Mississippi Rivers. (Courtesy John I. Hay Co.)

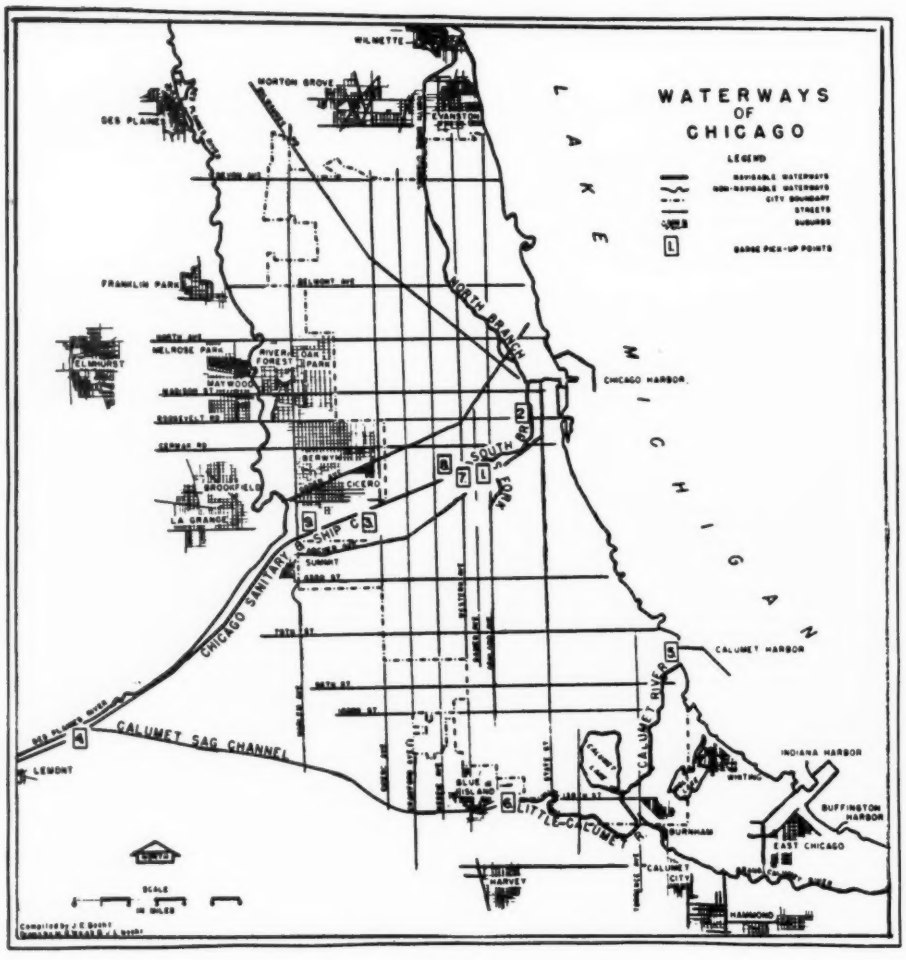



Fig. 4.

the barges reach their various destinations will illustrate this operation of "turning tows" by carriers on the Illinois-Mississippi Waterway. The enormous size of the Chicago Industrial area and the dual nature of her waterway arteries impose time and distance factors important to inland water transportation (Fig. 4). Just how great these factors are becomes more apparent when it is pointed out that the following record of assembling a tow required almost two days. Also, as mentioned above, not all carriers encounter exactly the same combination of conditions. For instance, those specializing in the transportation of petroleum, coal or sand may have fewer points of "delivery" and "pick-up" for their barges,

and thus are able to assemble them more quickly than a carrier handling mixed tows.[1]

## HOW THE OPERATION WORKS

The steps followed in gathering the tow under consideration and moving it downstream from Chicago are numbered in Fig. 4. At 11:50 A.M. Sunday, November 12, 1950, the "Horace E. Horton," a 1200 H.P. diesel towboat, with retractable pilot house, reached its

FIG. 5. The 890 Foot Tow in Brandon Pool as Viewed from the Pilot House of the "Bernard B. Walker."[2]

company's terminal at Robinson Street and the South Branch of the Chicago River (Fig. 4, point 1). The first assignment (for the master) after taking aboard provisions was the delivery of a barge containing approximately 1000 net tons of sugar to a warehouse located at South 18th Street and the River (Fig. 4, point 2). After that was done the towboat was returned to the terminal (Fig. 4, point 1). There it picked up a jumbo barge holding over 1200 tons of semi-finished steel which was the first barge to eventually form

[1] A tow consisting of more than one kind of commodity is referred to as a "mixed tow."

[2] Barges in immediate foreground are filled with steel, one consigned to St. Louis, the other to Gulf Coast points. On the right are empty alcohol barges being returned to Houston, Texas. Two 19,000 barrel oil barges are at the right front end of the tow, a small oil barge is on the left front, behind it are the standard barges containing cofferdam piling and prefabricated bridge girders.

the "downbound tow." At Cicero Avenue and the Canal a second unit was attached to the first barge (Fig. 4, point 3). This was a tank type barge especially constructed for industrial alcohol (Fig. 5). At 5:08 P.M. these two barges were "tied off,"[3] just below the entrance to the Sag Channel (Fig. 4, point 4), and an empty standard barge, with a capacity of approximately 100 short tons, was taken in *tow*. A slow, tortuous trip up the Sag Channel was begun after having to wait twenty minutes for a downbound *tow* to clear

FIG. 6. The Towboat "Spencer" of the Blaski Lines Passing the Heavily Laden "Horace E. Horton" in Passing Place No. 3 of the Sag Channel.

the narrow sixty foot channel. After squeezing past several other downbound empties and two heavily loaded coal carriers the empty standard was "tied off" at the Carnegie-Illinois Steel Company docks at 10:05 P.M., still the 12th (Fig. 4, point 5).

Two barges, one filled with 800 tons of cofferdam pilings destined for a Tennessee River port, and the other loaded with some 650 tons of fabricated bridge members for the new Illinois Central Railroad bridge at Cairo, Illinois were moved to a point just east of the Blue Island Locks (Fig. 4, point 6), and "tied off." The towboat then returned to Calumet Harbor to pick up a jumbo barge containing 1150 tons of semi-finished steel for St. Louis. Originally, lake tugs were to have towed it from the Inland Steel Plant at Indiana Harbor to the mouth of the Chicago River in order to avoid the narrow and crooked Sag Channel but rough water on Lake Michigan forced the shippers to route it thru the Sag. By 7 A.M. of November 13 all three had been cabled together and the tow

[3] Tied to the bank, or to pilings.

was then "twisted and snaked" thru the Sag (Fig. 6) to be fixed to the two barges previously fastened near the junction of the two canals (Fig. 4, point 4).

Then traveling light[4] the "Horace E." returned to the company terminal (Fig. 4, point 1), before once again proceeding downstream picking up two empty 19,000 barrel petroleum barges, a second empty alcohol unit, and a third smaller oil tanker from three different companies along the canal (Fig. 4, points 7, 8, and 9). Just below the Junction of the Sag Channel and the Sanitary and Ship Canal all nine barges were locked together with winches and cables by 11:20 P.M. of November 13. Then the completed tow started "downbound."

About 3 A.M. November 14, locking operations were begun at Lockport. The size of the load required "double locking." This operation took some four hours and thirty minutes. As two loaded grain barges were to be picked up downstream, one at Morris, and another at Havana, it was decided to "tie-off" the oil empties in Brandon Pool, immediately south of Joliet, so as to avoid double locking thru all seven levels on the Illinois Waterway.

At Joliet the "Horace E. Horton" met the "Bernard B. Walker," a 3200 H.P. boat at 9:12 A.M. of the 14th. The "Walker" "took over" some forty-five hours after the "Horace E." had begun to collect the barges. Actually the average speed for the time the "switching" towboat was moving was 4.7 miles per hour. Delays were due to waiting for other tows to clear sections of the Sag, for railroad bridges to open, for fog, and for other traffic to clear the Lockport locks. As the tow passed thru Lockport it was 890 feet long,[5] carried 3800 tons of steel, and the combined capacity of the empty tank barges exceeded 75,000 barrels.

The "Walker," in turn, had brought a tow upstream consisting of four oil barges and one of fluorspar. The "turning of the tows" was completed in less than one-half hour, the empty oil barges were "tied-off" and the "Walker" then waited some forty minutes for the towboat "Montgomery" of the Federal Barge Lines to clear Brandon Locks before it was able to proceed downstream, eventually to encounter the 4200 H.P. towboat, "Fort Dearborn," and once again "turn tows."

The "Walker" had added to her load a barge holding 1450 tons of corn from the world's largest grain collecting center, Morris,

[4] Towboat proceeding without barges.

[5] This exceeds in length all but the very largest of ocean-going vessels.

Illinois, before meeting the "Fort Dearborn" midway between Peoria and Havana, Illinois. The "Dearborn" had brought northward a tow consisting of seven barges—three oil barges, two of Belgian pig iron, one of fluorspar and one of sugar.

Southbound from Peoria the average speed of the tow was but 4.5 miles per hour, due to low water, and was much less than its potential of 12.5 miles per hour. The "Dearborn," a Diesel-powered 4200 H.P. towboat, could not apply full power as that would occasionally cause its keel to hit bottom even in relatively deep waters of that section of the Illinois River.

The last of the Illinois Waterway locks, New La Grange, eight miles south of Beardstown, was cleared at 12:35 A.M., November 17. For seven hours on the morning of November 17 the craft was navigated with the aid of radar thru a heavy vapor fog. Even upon reaching the Mississippi River shallow water made it necessary to average less than six miles per hour until St. Louis had been passed.

One and one-half days were spent in St. Louis. There a barge of semi-finished steel from Gary was "tied off"; four of grain, two of steel, and one empty were added. The tow as it left St. Louis at 4:35 P.M. of Sunday, November 19, consisted of fourteen barges. When it arrived in New Orleans on Saturday, November 23, it consisted of twelve units, having "tied off" the bargeloads of bridge girders and the load of cofferdam piling at Cairo, Illinois. All six grain cargoes were consigned to New Orleans but the two alcohol tankers were to continue to Houston over the Intracoastal Canal, the empty standard was headed for Freeport, Texas, to be loaded with sulphur and the two steel units were to be unloaded at numerous destinations along the Gulf Coast of Louisiana and Texas.

## SUMMARY

Thus, we see that the operation known as "turning tows" is an essential part of Chicago's barge "switching operations." It is requisite for the orderly receipt of Chicago's waterway cargoes and for the dispatch of Chicago's outbound barge consignments. The operation has become an integral step in providing low cost water transportation between two complementary types of regions, Industrial Chicago, on the one hand, and essential vast reservoirs of coal, petroleum products, building materials, grain and chemical products on the other.

# THE TEACHING OF HYPOTHETICAL MAPS

LINNIE B. JAMES
Forest Hills Junior High School

The teaching of the hypothetical map is one of the best devices to teach new geographic concepts and to correct faulty ones. No two pupils have the same difficulties, and this device gives the teacher an excellent opportunity to do individual work with the members of the class. This unit of work will result in the class having a much better knowledge of geographic fundamentals and principles, and it will increase its understanding of geographic relationships.

Hypothetical maps may be adapted to any grade by eliminating or adding concepts. The following work is planned for an eighth grade class.

## THE ASSIGNMENT

"Have you ever tried to picture a land where everything was as you would like it to be? A place where you might find beautiful sunny beaches and rugged mountain scenery and a place where the people made the best possible use of the natural resources? That would be an ideal land, wouldn't it?

"We are going to make a set of maps of an imaginary country. We must place this country on the surface of the earth where it will not touch another large land mass. Later we shall make a land use map of this country; consequently, we must locate this land in a latitude where people can earn a living. On the physical-political map we shall place the items which are listed on the board.

"Now we are going to have some fun along with our work. You will be allowed to name your land anything you wish and we shall see how much originality you have in working out a clever map. Maybe someone will want to have Animal Isle and have it in the shape of an animal's head or Flower Isle and name all the places, surface features and land forms the names of flowers. Pirate Land, Disease Isle or Cartoon Country has interesting possibilities. After we have completed the two maps, we shall also write a brief description of the country such as we might find in The World Almanac. For extra credit you may plan a travel folder on this land which will interest people in visiting it."

Below is a list of the natural and cultural items to be placed on the physical-political map:

1. cape
2. peninsula
3. sound
4. island
5. isthmus
6. strait
7. bay
8. latitude
9. longitude
10. plains
11. plateau
12. mountain range
13. mountain peak
14. two rivers
15. falls
16. desert
17. swamp
18. delta
19. lake
20. two or more cities
21. canal
22. railroad
23. scale of miles
24. arrow showing wind direction
25. profile

## THE DEVELOPMENT

The working out of this assignment will require several days. It is necessary to develop the work step by step. A few questions about each item will clear up the confusion of uncertainty in the minds of the children. This is a period of real learning. Many pupils are really *seeing* geographic items and relationships for the first time. It is one thing to read meanings from a physical-political map and quite another to place natural and cultural items so that certain relationships will exist. This requires an understanding and application of geographic fundamentals.

Below are a few questions which will help to clear up any faulty concepts the pupils may have had about some of the natural or cultural items.

1. We shall have to be very careful in planning just where the plains, plateaus, and mountains are. Why? (Effect on precipitation, courses of rivers, location of lakes, swamp, use of the land, etc.) Look at this physical map of the world. Notice that the color bands are very uneven, wide in some places, narrow in others. What color is used for each type of surface?
2. Are you sure there will be water for the rivers? Will the region where they rise receive rainfall? One of these rivers will have a delta. What does this tell you about the course of the river and the surface of the land thru which it flows? If there is a falls in one of the rivers, what does it tell you? Find a falls on the physical map. What symbol is used?
3. What causes deserts? Is the temperature on the desert high or low? What is the surface of a desert region? (More children have incorrect concepts of deserts than of any other item. A physical map of southern Argentina will show desert

areas on three types of surface.) Where are the only two places where deserts might be found?

4. What are swamps? Find swampy areas on the physical-political world map. Of what value are swamps? What is the symbol used to show swampy areas? How are lakes formed?
5. List the reasons why cities grow where they do. Be sure you have reasons for placing yours where you do. You may need to wait until you have the land use map planned before placing the cities.
6. Why are railroads built where they are? Examine a physical-political map and see what natural features influence the routes. Can you name some regions where there would be few railroads? Will you need railroads on your land use map?
7. Everyone will have a different scale of miles. Why? How many miles (approximately) are there in one degree of latitude at the equator?
8. Place arrows to show wind direction. The latitude of your island will determine the windbelts in which your island is located. This will help you decide where the rainfall will be the heaviest.
9. Draw a simple profile under the map. (This provides an opportunity to exercise map reading skill and to transfer that information into graphic form.)

It is advisable to discuss the first nine items as the first assignment, follow with the next ten and then complete the list. Many of the pupils will finish each assignment at approximately the same time. As a result, there may be congestion at the teacher's desk as she does individual checking and teaching. It is wise to have the pupils sign a paper when they are ready to have their maps checked. They can then proceed with their work and the teacher can call each one in his turn.

### LAND USE MAP

"Now we must find how the people on this island can earn a living. Trace your map on a piece of scratch paper. Put in the chief surface features and color them lightly. We need to color the surface regions because different crops can be raised at varying elevations.

"We'll list the crops grown in each of the wind and calm belts,

the equatorial calms, the trade wind belts, horse latitudes, westerlies. I don't believe any of us are going to have our island in the polar wind belts, and so it won't be necessary to list crops and industries of this region. What effect will elevation have upon the kind of crops raised; what will grow on low plateaus, high plateaus of each of these regions? What use can be made of the mountain areas?

"If the people on your land are going to engage in manufacturing, give them some raw material. If minerals are necessary for the economy of the island, you may locate two minerals.

"What two kinds of symbols can we use? (Pictorial and non-pictorial.) Draw a blue arrow from the seaports and list the chief exports along this line. Draw a red arrow toward the port and list the imports along this line." (This requires the application of the knowledge gained from the entire project. It is necessary to know what could be produced in surplus amounts and what commodities will be needed.)

### Summary

The written description summarizes the information given on the two maps. Have the pupils write the description in encyclopedic form following a definite outline. Have them give the size in miles north and south, east and west, surface, climatic conditions, leading industries, chief crops, exports, imports, cities, and scenic spots. Writing this summary not only requires ability to read back the information placed on the maps but it gives opportunity to practice many geographic skills.

### Application

The travel folder is supposed to advertise the island in such a manner that it will attract tourists, prospective home-seekers, and industrialists. This work can be assigned as work for extra credit. It also provides additional work for the fast worker. Have a few commercial travel bureau folders brought to class. Discuss their merits.

### Testing

For a test, have the pupils answer the following questions about each of the regions described below: a. What climatic conditions would be found here? and b. What might the people do for a living?

1. A wide plateau stretched for hundreds of miles. The latitude is 30° to 36° north.
2. The latitude of this land is from 40° to 60° south. In the western part a high wall of mountains extends for hundreds of miles along the coast. In the east there is a rolling plateau surrounded by a coastal plain.
3. The latitude of this land is from 5° north to 5° south latitude. The surface is a rolling plain whose elevation is from sea level to 500 feet.
4. The latitude of this country is about 15° to 25° north. A high mountain range extends along the northeastern coast. Southwest of the mountains is a low plateau.

## CONCLUSION

Every pupil will benefit by this work. Teachers will be well paid for their effort by the interest created and by the amount of information gained by the class. Maps used in any class will take on more meaning because they will be understood.

A teacher is justified in spending three weeks or more on this project because thru it the student pulls together and applies all of his knowledge of geographic principles. Furthermore, it is a real test of his knowledge and ability.

## TROUT FLY ISLAND*

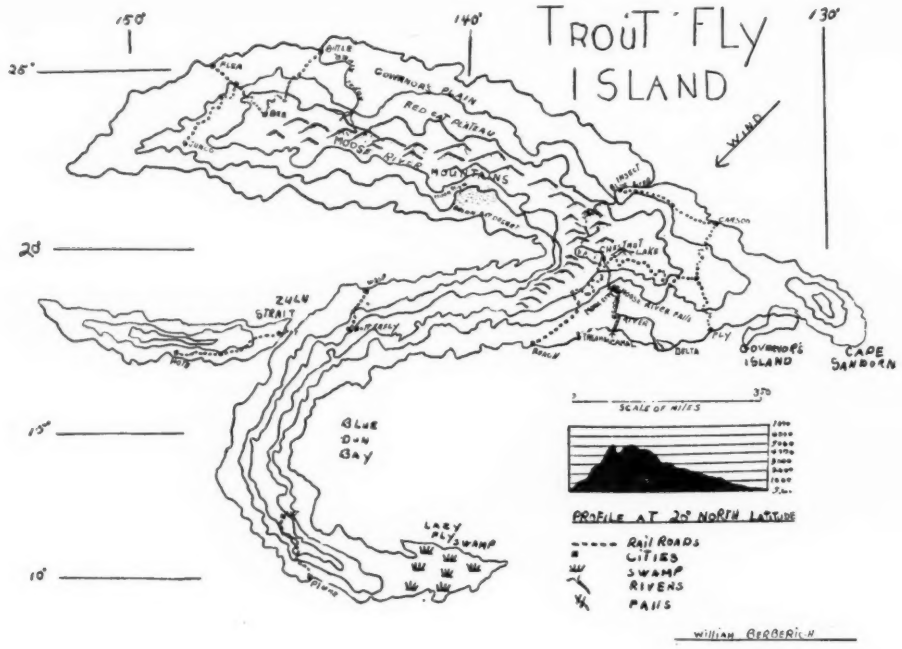
The following summary and map are a pupil sample of average (not the best) work on a project of the type described.

Trout Fly Island is one of the largest islands in the world. It is situated 130° to 150° west longitude and 10° to 26° north latitude (see map). The Moose River Mountains extend northwest and southeast thru the central part of the island. A high plateau extends around the mountains and thru the central part of the southern half of the island. A plain is found along the entire coast.

The climate of the island is delightful. The northeast trades keep the temperature cool thruout the year.

Trout Fly Island has a very large lumber industry. There are many large white pines in the Moose River Mountains. The trees are cut and the logs floated down Moose River to Chestnut Lake to a saw mill where the logs are cut into lumber.

* There are few people in the southern part because its climate is too hot and humid for white people.




Two minerals, coal and limestone, are found on this island. Iron ore is imported in large quantities for the steel mill at Moose City which is below the Moose River Falls. These falls supply electric power for the city.

This island's chief industry is farming. Many crops such as coffee, wheat, pineapples, are grown on the plateau and sugar cane, rice, corn and some cotton are grown on the plains. Many sheep and cattle produce meat, wool, and hides. The exports include cotton, wool, meat, hides, lumber, and citrus fruits. Gasoline, oil, iron ore, rubber goods, glass, paper, cloth, and machinery are imported.

There are many points of interest on Trout Fly Island. Moose River Falls drops 250 feet. The Limestone Caverns which are west of Lake Chestnut have beautiful formations which attract many tourists each year. On Lake Chestnut there are several beautiful resorts. Hook City in the Brown Bat Desert is a health resort.

# A TECHNIQUE FOR VISUAL EXAMINATION OF ASSOCIATIONS OF AREAL PATTERNS

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Maps provide a means of studying various combinations of elements of an areal association. This function is of critical importance to geographers. If the geographer is to understand an areal association he must know how to assemble the parts into an operating unit. He must know the relationship of the parts to the whole.

The graphic problem involved in the simultaneous examination of more than one pattern in a single map has always taxed the ingenuity of the cartographer. The object of this paper is to demonstrate a technique by means of which this visualization of an association of areal patterns may be more readily and more completely accomplished.

## THE TECHNIQUE

The essence of the technique is the successive projection and recording of several patterns, each of which is on a separate slide. Each pattern, as projected, is outlined in generalized form upon a common base map. The result of the technique is partly the visual experience of the build-up as the patterns are added, and partly the opportunity of viewing simultaneously a number of patterns in combination under the circumstance that the cumulative build-up experience is a background to the finished product. It is more meaningful to view a large number of patterns superimposed than it is to view them separately or in comparison side by side. This is particularly true if one may see them added one by one or in various successive pairs with the further opportunity of focusing attention specifically on any one in the series at will in relation to all the others, irrespective of the order of their original accumulation.

The technique is divided into three operations: 1. preparation of slides, each containing one of the patterns, 2. projection of slides, and 3. recording each of the successively projected patterns in more or less generalized form on the common base. A fourth step, the geographic interpretation of the patterns thus viewed in various combinations and in their totality, is, of course, the final purpose of the technique. Geographic interpretation of the results of the technique in any given case is not properly a part of the descrip-

tion of the techniqe itself, however, and will be dealt with in this paper only in general terms.

## Preparation of Slides

The slides are prepared on 35 mm direct positive color or black and white film. Equipment for this purpose may vary. A Leica camera was used in conjunction with a ground glass copying attachment. Fig. 1 shows the arrangement of the equipment. The 35 mm

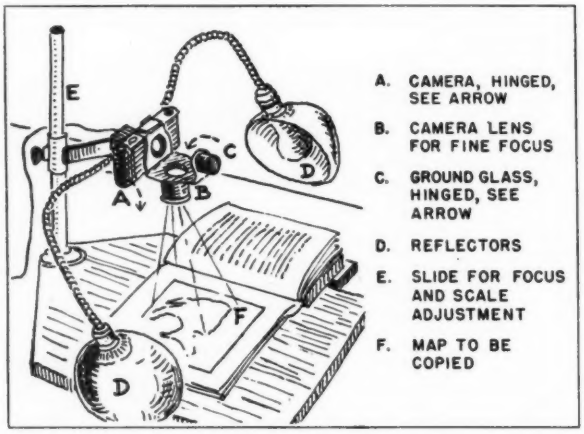


Fig. 1. Arrangement of equipment for making slides on 35 mm direct positive film.

camera and the detachable ground glass copying attachment are supported on a standard enlarging easel. Goose-necked lamps with reflectors are used for illumination. The ground glass focusing attachment has three elements which are hinged. One element is the opening to which the camera A, without the lens, is attached. The second element is the threaded opening to which the lens B, is inserted. The third element is the ground glass C. Scale is crudely adjusted by moving the camera-supporting arm vertically on the slide E. Fine focus is secured by moving the lens B vertically until a sharp image is seen in the ground glass. The ground glass is rotated out of position and replaced by the camera. Exposure is then made in accordance with the readings on a standard exposure meter.

## Projection of Slides and Outlining of Patterns on the Base

If a previously-prepared base is not available, the outline of the area may be sketched on a blackboard by outlining the projected

image of one of the slides. Prepared bases in the form of blackboard maps or standard paper base maps may be used, provided they are on the same map projection as the map slides.

The first slide is projected against the base map and the scale adjusted by moving the projector forward or back on the table as the case may require until the projected map as closely as possible coincides with the base. The salient features of the projected map are traced upon the base map. The second slide is then projected against the base map which now has the general outline of the first map recorded on it. Appropriate adjustments for scale are made in the same manner as in the case of the first slide. The second pattern is then recorded in a distinctive manner on the common base.

At this point the observation of spatial interrelationships, the co-variation or non-covariation of two patterns, starts. Tentative formulation of ideas or hypotheses leading toward future interpretation may begin. The technique as described is repeated thru a number of successively projected maps in the development of a composite map.

A simplified example follows. Printed maps do not reveal adequately the experience of seeing the composite built upon the common base map, the flexibility of cross-reference possibilities between projected and re-projected slides, or the effect of different orders of "accumulation." In the face of this limitation of the printed page, an unusually simple example has been chosen to illustrate the technique in order to facilitate the reader's mental picture of the build-up experience.

Maps A, B, and C of Fig. 2 are sections of United States Department of Agriculture maps showing acreages of wheat, corn, and oats, respectively, which have been reproduced as slides as described under operation one. The reader is now asked to imagine that the slide represented by map A has been projected on the base map shown in map D and that the areas of heaviest concentration of wheat acreage have been recorded thereon by the dashed line. After this, the slide showing corn, map B, was projected on the same base, now shown in map E, and the area of greatest acreage was similarly recorded, this time by a dotted line. For the purposes of this example only the most elementary observation of pattern interrelation will be noted; namely, that the areas of concentrated corn and wheat acreage are, for the most part, discrete. Upon the

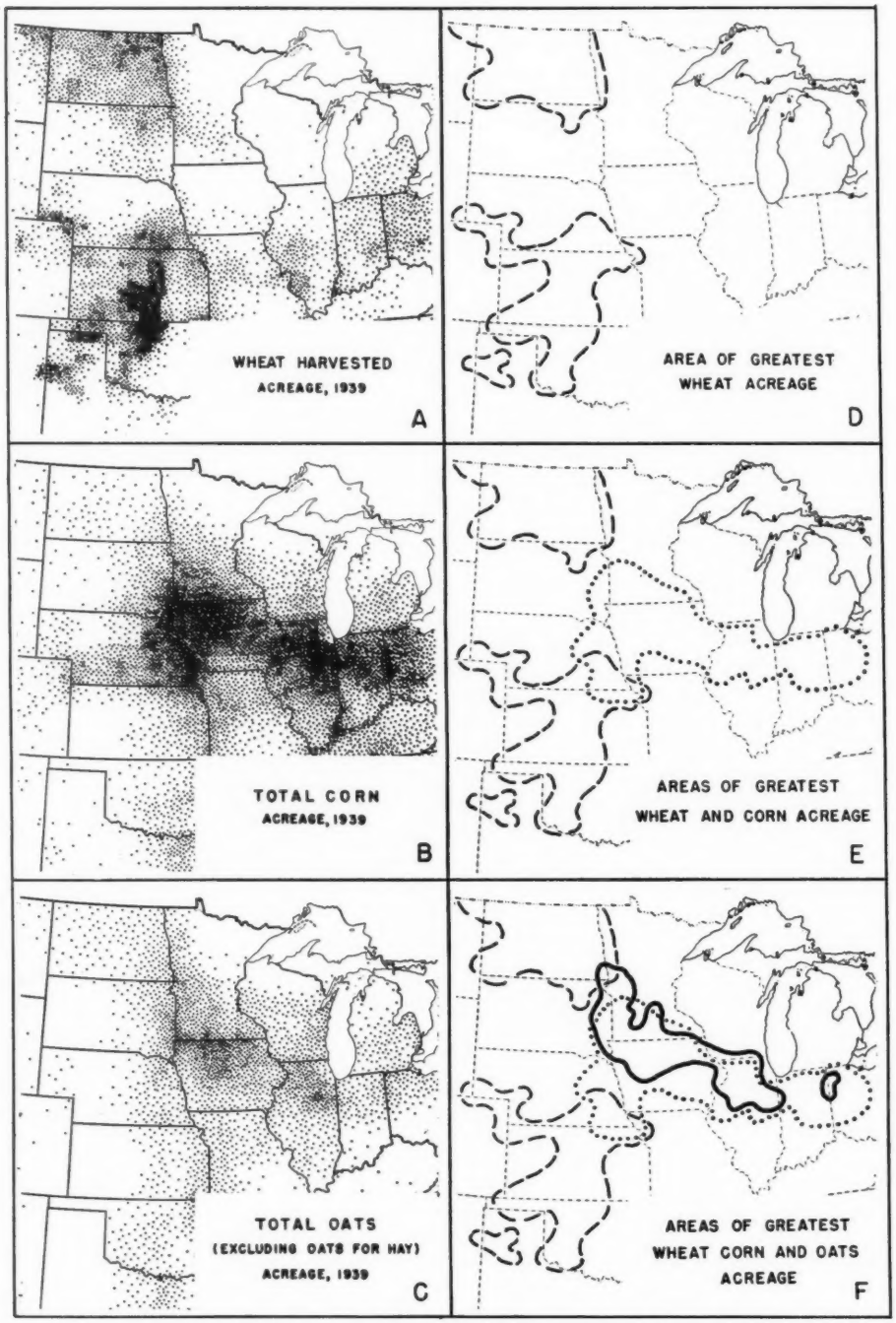


FIG. 2. Steps in the build-up of a composite map by slide projection.

base map to which areas of concentrated wheat and corn have been recorded (maps D and E) is now projected slide C showing oats acreage. The areas of concentrated oats acreage are then outlined upon the common base. This common base, as shown in map F, now has the areas of concentrated acreage of wheat, corn, and oats outlined upon it. It will readily be observed that the areal relationships of concentrated oats to corn are different than are those of the greatest acreage of wheat. In the case of the oats the area overlaps to a large degree that of the greatest acreage of corn, but is separate, in the main, from that of wheat. These three phenomena shown in spatial relation on the same map could now be used for the purpose of geographic interpretation.

The reader is warned not to expect, however, that this technique, which has merely accomplished physical juxtaposition of the three patterns, will automatically or inevitably lead the viewer to a geographic interpretation. It is perhaps unnecessary to point out that maps do not make interpretations, that they merely provide opportunity for interpretation. Geographers using understanding of phenomena and significant relationships between facts may find this technique a useful tool in their search for understanding of human occupance only if it is used to increase the flexibility and ease with which larger numbers of phenomena may be mutually examined and recorded.

The simplified nature of the example used to demonstrate the technique, on the other hand, should not be construed as indicative of limited potentiality. It is believed that experiment has shown this technique to be relatively more effective than either separate comparison or transparent overlay techniques as the complexity and number of patterns to be compared increases. For example, the distribution of production in the various stages of the iron and steel industry from mine to ultimate consumer may be more profitably studied using this technique than by either of the other two mentioned. In this case, slides showing the number of producing units in the United States by counties at such stages of the industry as the mining of ore, the coking of coal, the reduction of ore by blast furnaces, the conversion of pig iron to steel and its processing in rolling mills, the processing in the sheet metal industry, stamped metal products industries, and machine shops, were made from maps in the National Resource Planning Board Report, "The

Structure of the American Economy.''[1] Such a complex series of activities can, of course, be viewed as the reader was intended to view them in the original publication, by the comparison of the separate maps. It is relatively difficult, however, to appreciate the pattern differences by simple map comparison when more than a general impression is sought. To construct a readable black and white composite of this series of phenomena poses very serious if not insuperable difficulties to ''static'' cartography; yet when a cumulative composite map is built from slides of these maps by means of projection against a United States base map showing county boundaries, the visual experience of sequential build-up greatly increases the clarity of understanding and the precision of pattern comparisons. The technique may be adapted to many other sorts of pattern comparisons as well, such as changes in a given distribution from one time to another. Changes in population, the development of transportation nets, changes in acreage of production or of particular crops are cases to which this technique would be applicable.

## PROBLEMS IN THE USE OF THE TECHNIQUE

The technique described, illustrated, and partially evaluated does not solve all the aspects of the problem that one might hope. Its limitations may be dealt with under three headings, as problems of 1. preparation, 2. generalization, and 3. differentiation.

*Preparation.* The technique requires a certain outlay in equipment, labor, and time, as slides are prepared which make employment of the technique possible. Furthermore, if maps which it is desired to project are on differing map projections or are presented using too widely differing scales or symbols, those maps must be brought into a common framework of projection system, scale, and symbolism before they can be meaningfully superimposed by projection as slides.

With regard to the first point, ownership of the necessary equipment is becoming increasingly common so that use of this technique is a quite realizable possibility, particularly in cooperation with schools and universities. As to the second point, geographic literature provides ample unused opportunities for application of this technique without redrawing a single map.

[1] National Resources Committee, *The Structure of the American Economy,* pp. 48-51. Washington, D.C., USGPO, 1939.

*Generalization.* Again, it may be said that a generalized outline of a more detailed pattern of distribution is not an adequate substitute for the original map, and that there is danger of loss of accuracy and possibility of misinterpretation as a result. This difficulty is real enough, but it must be remembered that the technique as described is flexible to the extent that any pattern may be readily re-projected with reference to any others at will and that the build-up process may be repeated any number of times in any order. Thus, if adequate re-checking is done, misinterpretation should be far less than with visual comparison of separate maps. Furthermore, if judiciously employed, generalization of this type is capable of great positive benefits by focusing of attention and by the elimination of detail.

*Differentiation.* As the number and complexity of patterns increases symbol differentiation on the composite becomes increasingly a problem. Since it is not a printing technique, however, the individual use of color for differentiation is not barred because of its expense. The build-up experience and re-projection help keep pattern symbols differentiated during the mental process of studying the superimposed images. Also, the process of generalization of the outline of successively-projected patterns affords opportunity for selective simplification, as already noted. This possibility may be utilized to delay the point of "diminishing returns," so to speak, as more patterns are added. It might be suggested, further, that several associated patterns may be expressed by a single consolidated outline or pattern symbol. This device allows considerable extension of the number of patterns legibly recordable, altho admittedly it reduces the directness of graphic understanding.

The technique described in this paper represents an effective approach to one of the fundamental probems of both research and presentation for geographers—the graphic combination on a single map of multiple patterns in an areal association. The areal complexes geographers seek to understand and interpret are, after all, syntheses of infinite complexity. Parts must be studied in combinations approaching as nearly as possible the reality of an area as an operating unit if the geographer is correctly to understand or express the relation of the parts to the whole.

# THE GEOGRAPHY OF EDUCATION*

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Recent geographic publications have brought us such articles as "Geography of Manufacturing: What Is It?"[1] and "Medical Geography: Its Methods and Objectives."[2]

The purpose of this paper is to bring to you a brief explanation of the work geographers are doing in developing another special field of interest called "Geography of Education." Just as Isaiah Bowman used the title "By Way of Definition" for an entire first chapter in his book, *Geography in Relation to the Social Studies,* this paper might be entitled "By Way of Definition," since I shall attempt to show the relation of the geography of education to the whole field of geography.

If to some it may seem that there is danger of trespassing on other disciplines or of forsaking the geographer's realm, may they be reminded of the statements made by Richard Hartshorne in the introduction of his presidential address.[3] He points out that each of us working in an area of special interest can maintain the geographic quality of our work if we keep in the forefront of our thinking that the core of geography is "the study of places," that is, the analysis of the significant differences that distinguish the various areas of the world from each other. Education is one of the differences that is significant in this areal differentiation.

## BY WAY OF DEFINITION

The geographer is interested in education because he is interested in the conditions which are found in association in any given part of the earth's surface. Educational features and conditions of some type are present in any area inhabited by man.

In its broadest sense, education includes both formal and informal education. Even in areas in which there are no schools, libraries, churches, or other agencies of such organized institu-

* Paper presented at the meeting of the National Council of Geography Teachers, November, 1950.

[1] John W. Alexander, "Geography of Manufacturing: What Is It?," JOURNAL OF GEOGRAPHY, Vol. XLIX, No. 7 (1950), p. 284.

[2] Jacques M. May, "Medical Geography: Its Methods and Objectives," *Geographical Review,* Vol. XL No. 1 (1950), p. 9.

[3] Richard Hartshorne, "The Functional Approach in Political Geography," *Annals of the Association of American Geographers,* Vol. XL, No. 2 (1950), p. 95.

tional types, informal education of two kinds goes on constantly. One is the result of everyday undirected observation on the part of individuals. The other is the result of passing on, by word of mouth and demonstration or conscious example, of ideas from elders to youth. Elders seek in this way to induct youths into the social order of which they are members. The yield of such informal education consists of specific concepts, ideas, practices, habits, customs, and attitudes on the part of individuals making up the population. That there are vast differences thruout the world in the products of both kinds of informal education is a well-known fact. Just what these differences are and what their significance may be, is less readily determined. To those of us who have been analyzing our teaching problems, the differences in our pupils, which, in part at least, are the result of differences in their informal education (and I do not mean I. Q.'s), even within relatively small communities, are sometimes rather amazing.

We use the term formal education to mean school education or the sum total of experiences provided within the organized activities of educational institutions, public or private, at all levels. Abundant evidence of some of the differences in formal education in various parts of the world may be obtained from direct observations and from published statistics and reports. For example, in his splendid article on "European Colonization in Southern Brazil," Leo Waibel shows how formal and informal education differ in the three agricultural systems he distinguishes.[4] In discussing the primitive land-rotation system he states, "The colonist's children are sent to school for one or two years only, and a religious calendar is likely to be the only reading matter in the house." In the section devoted to the improved land-rotation system he says, "Children are sent to school for four or five years instead of one or two, and once in a while a newspaper or book may reach the house." Of education in the area in the final stage of agricultural development, crop rotation combined with stock raising, Professor Waibel says, "These colonists can afford to give their children a good education, and they themselves keep in touch with the outer world thru newspapers, magazines, and books." Differences in the value of the product or yield of formal education are not easily determined. In spite of progress made in educational

[4] Leo Waibel, "European Colonization in Southern Brazil," *Geographical Review*, Vol. XL, No. 4 (1950), pp. 533-36.

measurements, the less tangible abilities, insights, attitudes, and the like remain the significant results of school experiences.

Man is the *active* agent responsible for the *particular man-land association* found in any given region or locality. Differences in education both in informal and formal education, are reflected in differences in understandings, insights, attitudes, desires, ideas, and the like of peoples in different areas. The importance of these rather intangible elements in any areal complex must not be underestimated. Such differences in the agents, i.e. the people occupying a given area, are reflected in differences in the ways in which they change the part of the earth's surface they inhabit.

Accordingly, differences in education are reflected in differences in the character of human occupance in different regions and need to be understood in order to see under what circumstances such occupance has taken place.

Interrelation of educational elements with other elements in the whole man-land association in a given area is the basic principle upon which research in the geography of education is founded, *plus* significant characteristics of the people constituting the active human elements in that complex. Among the educational elements are 1. the people engaged in educational activities in the area (i.e. the youths getting an education, the teachers helping them to acquire it, and the administrators—in the United States this group is larger than is the group engaged in manufacturing, the agricultural group, or the group employed in any other single occupation—in other words, "Education is Big Business"); 2. the educational activities they carry on; 3. buildings and other features designed to facilitate such activities; 4. land used as sites for such activities, and 5. circumstances of the past or inherent in laws and ideas that have a bearing on educational features and activities.

## The Need for Research in the Geography of Education

At every stage in the history of the world educational change has taken place as the social order has changed. Changes in population, in uses of land, in scale of organization of human activities, and in immediate economic, social, and political problems spell new educational needs. Laymen as well as educators are constantly being made conscious of the numerous educational problems that must be solved if education is to play the role it should play in increasing the mental and moral stature of our people and in help-

ing to induct young people into the social order of which they are a part—local, regional, national, and international.

Since present-day changes in the social order are intimately interrelated with many changes in land use, including educational land-use (i.e. land used in carrying on of the educational work of schools and colleges) one way in which geographers may help in the solution of these educational problems is to study details of educational land use in areal units of varying size to reach conclusions concerning areal differences in educational land use and to discover ways in which educational land use is an integral component of the dynamic man-land associations found in the areas in question.

Three such studies of areas in the United States have been made and results published in doctoral dissertations.[5] Each investigator discovered 1. ways in which educational elements are intricately interwoven with other elements in the whole man-land association found in his particular area or areas; 2. educational needs and problems revealed by consideration of present educational facilities and their functioning; and 3. types of changes which might be desirable in the light of the findings. Needless to say, the results of the studies are very different, but all bear evidences of the values which such investigations may have in helping people in the solution of their problems.

A few pertinent facts from my Lake County study will show more concretely what I mean. This county located in the area fringing the large city of Cleveland represents the type of area in which social changes are developing very rapidly and problems there are very similar to those facing people in numerous urban fringes at the present time.

As a first step in the investigation I made a general land use map of the county. This map reveals that educational lands are part of an area which, as a whole, possesses certain urban characteristics such as the manufactural use of some of the land and the

[5] Herbert Henry Gross, *Educational Land Use in the River Forest-Oak Park Community,* Ph.D. dissertation, Department of Geography, University of Chicago. Chicago: University of Chicago Press, 1948.

Edna E. Eisen, *Educational Land Use in Lake County, Ohio,* Ph.D. dissertation, Department of Geography, University of Chicago. Chicago: University of Chicago Press, 1948.

Allen K. Philbrick, *The Geography of Education in the Winnetka and Bridgeport Communities of Metropolitan Chicago,* Ph.D. dissertation, Department of Geography, University of Chicago. Chicago: University of Chicago Press, 1949.

use of a very large part of the area chiefly for residential purposes. On the other hand, the map reveals that certain characteristics of the area are those commonly found in rural districts. For instance, the dominant use of a few parts of the area is agricultural (chiefly nurseries), some farming is going on in areas classed primarily residential, and there is much land in which settlement is not compact. A considerable area classed as "idle" land is land being held for future use for factories and homes, an indication that change toward an increasingly urban character is expected and has been going on. It is clear that increasing industrialization and urbanization characterize the changing scene from which youths of Lake County draw a large part of their informal education.

Closely associated with changes going on in land use are changes in population. The number of people to be served by the schools has been increasing at a higher than normal rate (from 50,020 in 1940 to approximately 65,000, an increase of more than 20 per cent). The increases have occurred in all parts of the county, in the number of people in the dispersed as well as in the compact settlements. Percentages of people in the various occupation groups suggest an urban rather than a rural community—manufacturing 41 per cent, trade 15 per cent, services 23 per cent, transportation 8 per cent, and agriculture 12 per cent. Perhaps most striking are changes occurring in the racial character of the people, in their general levels of living, in cultural and educational attainment, and proportion of people in various age groups. The vast majority of the people (88 per cent) are American born and in the school population there are practically no foreign born. There are various distinctive sub-groups among the American-born group with significantly different backgrounds, antecedents, and ideas. In fact, there is more contrast between some of these sub-groups than there is between American-born and foreign-born groups. In view of these wide variations in the cultural backgrounds of the people, it is obvious that there are wide variations in the informal educational opportunities of youths in the county. The median number of school years completed by persons 25 or more years old was 9.4 (Ohio 8.6, U. S. 8.4) indicating a relatively well-educated population. There are evidences that the major growth in population has been in the lower age brackets and that the percentage of the total population in the school-age group will increase and so the educational facilities will have a much larger number of youths to serve.

The analysis of educational developments in this changing urban-rural setting showed that, in spite of the changes in the direction of functioning increasingly in urban ways, Lake County is being served by an educational system designed primarily for rural areas.

Without going into detail about all the educational elements, the major aspects of educational developments in Lake County may be summarized as follows:

1. There has been a relatively high degree of educational development in terms of the ratio of the number of graded schools to the population of school age.
2. Most of the education is public-controlled, but there are a few church and private schools.
3. Emphasis is on general education with exception of one private high school for girls and a new special church school for girls. The work is conservatively traditional.
4. All special and all college training is non-public and only for girls.
5. All public education is at first and second level; church-related education is at first level.
6. Organization of the schools is not uniform—8-4, 6-6, 6-3, 6-6-3, etc.
7. Administration in terms of school districts is relatively complex—county, city, exempted village, township locals.
8. The machinery for financial support is intricate based in part on local taxation, in part on a complex system of state aid.

Special needs and difficulties must be recognized by the people of Lake County if they wish to get the best educational yield they can. These include:

1. Need for more opportunities. Very meagre opportunities are now provided by the schools for children less than six years old and for citizens of post-high-school age. The scope of experiences provided for those of elementary and high-school ages is inadequate in breadth.
2. Many difficulties are rooted in the present pattern of school districts and associated systems of school administration. It is extremely wasteful of expense and energy to have 12 (now 11) boards of education and 9 relatively well paid superintendents in an area in which there are only 10 or 12,000 children in these schools.

3. There is a need for reorganization of the school-district pattern and administrative practices associated therewith.
4. The current state policy of subsidizing thru *special* state aid efforts of illogically sized and shaped school districts to become educationally self-sufficient is not sound, if permanent.
5. There is need for study of relative merits of different plans of organization.
6. More elementary schools are needed and they should be more widely distributed than at present. Elementary schools as a whole are now over-consolidated, whereas junior and senior high schools are under-consolidated.
7. The fondness of many people in the county for the present school districts, and fears which people entertain with regard to possible results of district reorganization on a larger scale, constitute obstacles in bringing about needed changes in school districts.

It will be no simple matter to lead people of Lake County to bring about a district organization which will make for greater efficiency in fulfilling local educational needs without lessening local interest in community schools, local responsibility for them, and local differences in school work which are in harmony with differences in local educational needs. In the light of the findings concerning the character of the area, it seems likely that a single school district might prove a more satisfactory administrative unit.

## Challenging Opportunities

It is hoped that the geography of education may contribute a real service to the present day educational program which Dr. Alonzo Grace has called "the greatest experiment in mass education ever conducted."[6] That there are many differences in the educational opportunities and facilities available to the youth in different parts of our vast country can be recognized in a general way if census and other government data concerning educational elements are plotted on maps. One of the most strikingly uneven distributions is that showing numbers of junior colleges. Of the 464 in the country, the three states of California 49, Texas 35, and Iowa 27 rank highest. Ohio with 65 colleges has only 2 junior colleges. There are those who believe it is the function of the federal government to provide financial support to equalize educational

[6] In an address at Kent State University.

opportunities. It is my opinion that education is the function of the community, especially at elementary and high school levels. That it seems is definitely the conclusion Dr. Grace has reached after his experiences in Germany where he was in charge of the educational program in the American zone.

In Ohio, as elsewhere, educators are deeply concerned about the need for school buildings, teachers, and funds. Statistics show an Ohio elementary school enrollment for 1950 of 900,000, an increase of more than 100,000 since 1946 and an estimate of one-quarter million more or 1,100,000 by 1954. The total public school enrollment, elementary and high school, for 1954 is estimated at 1,400,000. For this increase they estimate a need for 8,300 more teachers, and a new building every other day during the next four and one-half years.[7] In many areas in Ohio, problems of size and number of school districts and of administrative practices associated therewith, make it difficult to provide opportunities to secure the best possible educational yields. There are 88 county superintendents, 113 city superintendents, 88 exempted village superintendents, and almost 1000 administrators of township local districts, known as executive heads. In many counties there is evidence of over-consolidation of elementary schools and under-consolidation of high schools. In Union County, for example, of 14 schools 10 are high schools, 9 with less than 100 pupils each, one with only 39. Certainly similar difficulties may be found in other states.

Each community within a state must work individually to determine its own educational needs and difficulties and then try to get together to help solve any larger over-all problems.

## CLASS-ROOM OPPORTUNITIES

Children in each school can assist in collecting information which will be needed by their elders. One project which could be undertaken immediately in each school is the making of a large-scale map of the service area of the school on which the home of every child is shown by a symbol which indicates its location. More advanced students should map land use in the area and gather other information which will help them see how intimately problems of educational land use are interrelated with other community problems. Basic facts about taxes in their own community can be used

[7] "Problem No. 1 Good Schools for Ohio Children." Ohio Education Association, Columbus, Ohio.

by high school students in helping to understand support problems. Tax valuation is intimately related, of course, to land use and character of area.

It is not to be expected that the youths can solve the educational problems, but by these activities they will be helped in understanding the area in which they live, the interrelation of the activities in it, and the interdependence of their area and other areas. Not least of the benefits would be the satisfaction gained of having participated in contributing to a real community need. After the people of the community have seen what their school needs and educational problems are and gone as far as they can in the solution, then they may feel it necessary to call in consultants—not merely educational experts but geography experts skilled in regional analysis, economic advisors, sociologists, psychologists, and professional planners.

The opportunities for youths in schools to participate in such community studies is one of the vital ways in which geography may function in the educational program.

Studies of the characteristics of institutionalized education in many areas both in the United States and in other countries are needed in the development of the geography of education as a phase of systematic geography.

Since it is my firm belief that the ideas and points of view gained from both formal and informal education are significant elements in the man-land associations which characterize regions, I believe we, as teachers of geography, have another responsibility. It behooves us to see that the formal education for which we are responsible develops in our students the ideas and points of view needed to gain a real understanding of people and places; to help our students see how the character of education in the places they study about has a bearing on the man-land associations characterizing these areas and how the man-land associations, in turn, have a bearing on the type or character of education.

# THE RANGE OF CLASSICAL GREEK TRADE

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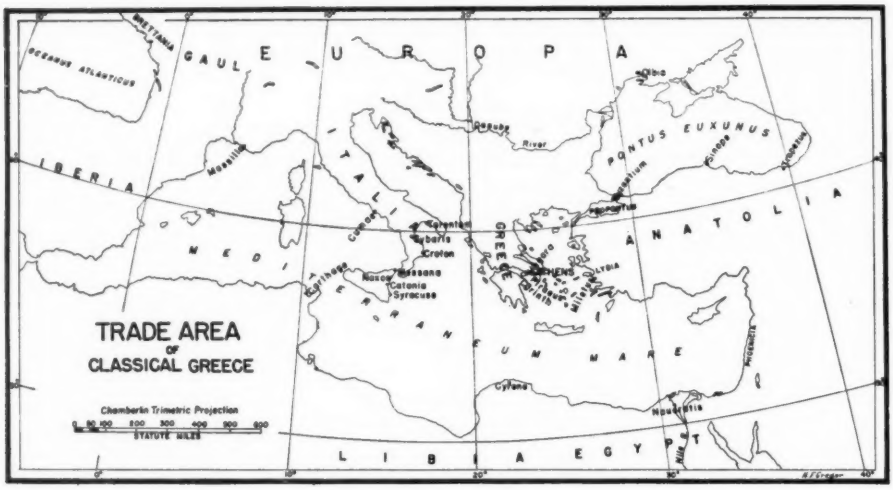
In the early morning the sea was glassy and a fog hid away the land towards which the ship was heading. Aside from the sound of the ship as it made headway there was only the sound of the forty oars against the wooden locks in the ship and the occasional grunt of the slaves as they managed the great sweeps. From time to time the slave master would call an order. The captain stood by himself on the deck and watched eagerly for signs of the port. Thru the light morning fog he had seen the headland of the island of Salamis. He was now sailing directly off Peiraeus. With the progress of the morning the haze lifted. At last he could see the port busy with ships and then he could see Athens, the great Athens. It was marked by a thousand plumes of smoke from the house fires for the morning breakfast.

The captain was exceedingly pleased with himself and the good fortune of his trip. He had come from Massilia in distant Gaul and he had in addition to the usual cargo a quantity of tin. This tin was exceedingly desired in Athens and brought high prices. Usually the tin was obtained from Phoenicians and they charged for it as they saw fit for the Phoenicians had a monopoly and were the only ones who dared the sea route to Britain. But this tin had been obtained by Gauls of the northwest (Brittany) who were good sailors. There a venturesome Greek had traded for it and brought it south to Massilia with a pack train. The captain had bought the tin and therefore had broken the monopoly and he was pleased. He would make a good profit.

## WHY THE GREEKS TOOK TO THE SEA

Greece was a land ideal for sailors as was no other land with which we have had contact. Its shore was a myriad of coves and harbors and the sea was except for the winter months free from storms. Moreover, the sea was without heavy fogs and it had no tides. And then there were islands about the sea so that one was never out of sight of land in the blue Aegean except for an area in the north and even there Mount Athos could often be seen like a signal from the gods high above the haze.

Moreover, the Greeks were forced to sail. The mountain ranges




stood knee deep in the sea breaking up travel by land. The ancients did not climb mountains much. The gods lived on mountains as on Olympus and there was no central valley or extensive coastal plain in all this land. There was no Nile or Euphrates. There was no plain along the sea as in Phoenicia. There was no unity to the land as there was in Crete. Greece had no Main Street except the sea. The Greeks were known to the Egyptians as the bronze men of the sea. They were said to be like frogs, all about the sea ready to jump in. Moreover, it has been said that Greek history was so maritime that the oar was more important than the shepherd's crook.

## THE FIRST COLONIES

The Greek ships carrying cargoes became very numerous. The seas about her became gay with colored sails. To this point in history there had never been such an active commerce of the sea. This was because of her colonization.

Perhaps Miletus was the first city to colonize extensively. Miletus lay on the Ionian shore in Asia Minor. It was at an early date a city of importance and was the home of the first geographers of Greece. It had in the region enough rainfall (22 inches annually) to support grain fields. But its population grew as did its wealth and soon it was sending out ships searching for fish and grain and establishing colonies. These colonies were on the Black Sea, the Pontus Euxine of the ancients. It was called the Pontus because of its great depth. Sailing its waters was a venturous task for it was

open to the winds and storms that developed over the Russian plains.

The city of Megara prepared the way for colonization of the Pontus. Megara was a city with a location that was essentially commercial. It lay on the isthmus of Corinth and so had contacts both with the Aegean and to the west by the Corinthian Gulf. It was limited in area and its agriculture consisted of "farming rocks." It was known for its manufacture of coarse woolens and for its large pots. Soon the Megarans were establishing themselves in colonies on the Hellespont and the Sea of Marmora (the Propontus), and on the Bosporus they founded the important city of Byzantium. This was to become Constantinople and later Istanbul.

With the way thus prepared, the Ionian cities began colonization of the shores of the Black Sea. To begin with these colonies were commercial rather than agricultural. Sinope was created midway on the southern shores of the Black Sea as a point where the manufactures of the city of Miletus could be traded. Again Miletus established Trapezus (Trebizond) on the eastern end of the Black Sea at the end of the caravan routes into Asia. Miletus literally ringed the sea with colonies, with those on the north shore which were largely agricultural and for fishing. Athens which had little agriculture except wine and olive trees, made wine and oil jugs to hold the products and traded them to these cities, particularly Olbia, for grain and fish.

Tho at first the Egyptians did not welcome Greek colonists later the Greeks did establish themselves at Naucratis on one of the mouths of the Nile. Many cities took part in the colonization and there was a great commerce, largely in wheat. Farther west in Libya was founded Cyrene. About the city, the climate must have been more favorable in those days, were large fields of grain. Moreover, Silphium was obtained there, a popular physic. Cyrene was an exception to Greek colonies. There colonial cities were located, usually on a hill, from which their ships could be seen. The Greek liked to see the ships which were a reminder of his connection with the homeland. Cyrene was on the contrary in the interior high in the mountains which acted as shield against hot winds of the desert.

## THEY GO WEST

It was to the West that the Greeks went with high enthusiasm.

Here was a new land, the America's of that day. In the instep of Italy they founded rich cities and as a group they came to be known as Greater Greece. Sybaris, Croton and Tarentum were some of the cities. They went up the west coast of Italy to just north of Naples where they located Cumae. This city influenced profoundly the Etruscans to the north and transferred the Greek alphabet to them, who later gave it to the Romans.

Eastern Sicily they colonized. The first settlement was Naxos, which is now covered with a lava flow from Mount Etna. Catania, Messena, Taromina, with its lovely site, and Syracuse were Greek cities. Syracuse was founded by Corinth. During the seventh century B.C. Corinth, facing on two seas, was the leading commercial city of the Greek homelands. Syracuse was to become one of the greatest cities of the Mediterranean, surpassed in size only by Carthage and Athens.

The Greek did not settle on the northwest coast of Italy for it was held by the powerful Etruscans. But along the coast of northern Italy and southern France practically all the present cities had Greek origins. Massilia was the foremost city. This is modern Marsaille and is on a harbor as near to the mouth of the Rhone as possible. From the first Massilia had important commercial relations.

The trade between the colonies and the Greek homeland cities became great. Always there was food produced in greater quantities on the wider plains of the colonies than those in Greece. Then the colonies developed a trade with their hinterlands, mainly in metals and lumber both of which the shores of the Mediterranean, and particularly the Aegean were lacking. In turn for these, Greece had become an industrial country, largely on slave labor. Greece is usually thought of as a country renowned for its philosophers, dramatists, poets and sculptors. But economically Greece was a country of manufacturers, commercial men and shop keepers. The pottery industry was large, large and small pots for commercial purposes, but also pots and urns of high artistry. The urns of Attica beautifully designed, are found in Asia Minor and distant northern Gaul. The woolens, mainly of the dyed purple, of Miletus; metal utensils and arms from Corinth; and jewelry of Ionia are some distinguished items of trade. But Greece, all of Greece, was manufacturing articles, fine and coarse, with which to stimulate trade and they were busy building ships with which to carry on the trade.

Moreover, they were coining money in considerable quantities. Lydia had been the first country to use money and the wealth of Croesus, King of Lydia, was founded on this coinage. They were bean shaped, being cut from a bar of metal. Then Lydia and, following the example, the Ionian cities began making true coins and stamping them to guarantee their purity. At first they were of electrum, gold and silver mixed, and came to be alloyed at the proportion of a little over 13 times as much gold as silver. In Greece there was little gold and coinage became largely silver. Athens with large silver deposits became famous for its coins.

The importance of a somewhat ample coinage was important to the growing trade. A money economy was now taking place of the barter system and gradually the custom was evolved where two men were essential to every expedition. A man with money paid for the venture while another carried it out. Thus a monied capitalistic class came to be and their jealousies led states into struggles against each other and even wars. Great wealth increased a trade in fine luxuries.

The development of colonies mightily spread Greek culture. So superior was their civilization compared to what the Greeks referred to as barbarian that the colonists did not take on habits from the barbarians but at first ignored all that was not Grecian. Greek provincialism was strong and clung to in the same manner that the Greeks loved their ships that connected them with their home polis. To quote Trevor (*History of Ancient Civilization*), "the colonists brought with them their political and social institutions, their money, their alphabet, their religion, their art, their industrial products, and later their poetry and philosophy, indeed all the characteristic elements of their culture—to the Euxine, North Africa, Sicily and Italy and to distant Massilia—and these were assimilated to a considerable degree by the native peoples." Indeed, the colonist furnished some of the more distinguished Greeks in philosophy and literature. What is perhaps the most beautiful theatre of Greek remains is in Taromina, in Sicily, and the most beautiful temple is at Paestum on a now deserted plain outside of Naples.

### ATHENS BECOMES THE FIRST CITY OF THE HOMELAND

Corinth was a great commercial city situated on its narrow isthmus. Indeed, in the earliest time men used to haul boats over the land between the Aegean and the Gulf of Corinth. Later ships

unloaded their burden which was reloaded on ships to save the long journey about the many points of land of the Peloponnesus. So important was the commerce that Julius Caesar planned a canal there but his surveyors believed the sea higher on one side than on the other and the plan was abandoned. Corinth had a large freight.

But it was Athens that we must look to in order to discover a truly Grecian trade. Its commerce was the grain and fish which was like bread in importance in feeding the city. Its ships visited ports established by other cities. Its grain came from Olbia and Naucrates. Its ships were found in the harbors of Cyrene, of Sicily and Massilia. It came from an Athenian freedom of the seas but this became literally a monopoly. The Aegean became an Athenian lake. Peiraeus, the port of Athens and five miles from it became an intensely busy port. Merchant ships, sailing 70 nautical miles a day, used to bear up to 7,000 bushels of grain as a cargo. The total imports would be 1,500,000 bushels of grain annually as well as dried fish, meats, copper, timber and textiles and a thousand other commodities. In turn Athens was shipping olive oil, wine, pots, artistic vases, arms and metal work. The Athenians were shop keepers and small industrialists. Much slave labor was owned. A few factories were sizeable. One shield factory employed 120 slaves. There was a large trade in arms and a section of the city was devoted to pottery. As with all the commercial towns there was an active ship building industry. But Athenian commerce was not confined to a trade in commodities. With a widespread sailing such as no city had ever before enjoyed, Athenian ideas, not the least being concepts of democracy, were spread over the Mediterranean. Every ship putting in to port brought an invisible cargo of ideas. This applied to Athenian ships in distant ports and to all ships putting into Peiraeus. Athens was the cosmopolitan city of the times.

# NATIONAL COUNCIL AT WORK

The National Council of Geography Teachers is organized to promote and advance the teaching of geography. The questions may well be asked: "How effective is the Council in achieving this objective?" "Does the organization have the power to produce any definite improvements in geographic education?" There are times when it is appropriate for any organization to pause and answer questions like these, to realize what it has accomplished, and to plan for a more effective future.

Now that the annual meeting of the 37th year has passed, and we are looking forward to participating in the program for the 1952 International Geographical Congress, this may be an appropriate time for the National Council, itself, to take stock. This page will carry a short paragraph each month, therefore, on the activities of the Council which are designed to increase the effectiveness of its work. You, as a member of the organization, are invited to send this office suggestions for achieving this objective.

## INCREASING OUR EFFECTIVENESS

### A. Thru a Growing Membership

The first task of anyone trying to increase the effectiveness of an organization such as ours is to look at its membership roll. Over the years the National Council has been a growing organization. We are proud of this fact, but we are even more happy to learn that more and more of our members are continuing to keep their names on the membership roll year after year. In order to recognize those who have continued to support the National Council thru continuous membership over a period of five consecutive years, there was established, in 1946, the class of "Fellow of the National Council." The list of active Fellows continues to grow month by month. It is a pleasure to announce that the following members, in addition to those published, have now been designated Fellows. Lester H. Baach, Mrs. Carl Benner, Sophia Blizak, Dongald G. Brandon, Ella E. Day, Lee A. Diehl, Harold Folkins, Lillian E. Hamlin, Roy W. Hatch, Loretta Hiestand, Harriet Mathison, Wilma Sadler, John Strietelmeier, Eleanor Wiegand. We are happy to welcome to this new class of membership, and hope that you will continue to serve the Council when called upon to do so.

The problem of expanding the membership of the Council is one with which every member can help. If each of you will promise to secure at least one new member this year, we can go a long way toward increasing the effectiveness of our organization. Such a job can be done without much effort on anyone's part. If you are a member of a college department of geography, find out who isn't a member on your staff, and get them to join. If you teach in a high school or at the elementary school level, get a fellow teacher interested in the organization. Often times they are not members because they do not know about the Council and its activities. Here, then, is my assignment for this month, GET A NEW MEMBER IN '52. In order to keep a record of which present members discharge this duty, I suggest that you send me a postal card when you obtain a new member, stating his name and address and teaching position. Those members who secure a new member in '52 will be issued a special badge to wear at the annual meeting next year. Be amongst those who increase the effectiveness of the National Council by helping to expand its membership.

CLYDE F. KOHN, *President*

# GEOGRAPHICAL PUBLICATIONS

**Conservation Education in American Schools** (Twenty-ninth Yearbook, American Association of School Administrators). Washington, D.C., 1951. 527 pages, illustrations, appendix and index. $4.

This well printed and edited book was prepared by a committee of nine city superintendents and other administrators headed by Kenneth E. Oberholtzer, Superintendent of Schools at Denver. The volume is intended for reference rather than as a textbook. It will familiarize administrators and teachers with most phases of conservation. The fact that an entire yearbook is devoted to conservation shows the growing interest in the subject by administrators and their recognition of the desirability of expanding and improving instruction in conservation in the public schools.

The purpose of the book is indicated by a quotation from Aldo Leopold: "Conservation is a state of harmony between men and land." It is emphasized that conservation deals with the wise utilization of natural resources, not to miserly hoarding. Proper resource use should result in the greatest good for the largest number of people for the longest time.

The first two chapters are general in scope and briefly describe the need for conservation and the efforts made by government agencies and others towards a sound conservation program. The remaining eight chapters deal with contributions that education can make to the furthering of such a program.

One of the chapters is a guide for school programs in conservation education. Another deals with instructional materials and facilities. Good practices in both rural and city schools are described, as are selected state and regional programs of conservation education. The final chapters are devoted to the preservice education of teachers and administrative leadership.

Much of value is included in an appendix in which there are 37 pages of selected references on conservation education, 26 pages on audio-visual materials on conservation and resource use, and 14 pages that list organizations and agencies concerned with conservation.

*Conservation Education in American Schools* deserves a place in all school libraries and is a valuable reference for geographers with an interest in conservation.

*Eastern Washington College of Education* OTIS W. FREEMAN

François E. Matthes. **The Incomparable Valley: A Geologic Interpretation of the Yosemite.** Edited by Fritiof Fryxell. University of California Press, Berkeley and Los Angeles, 1950. xvi and 160 pages. 13 diagrams, 50 plates. $3.75.

François Matthes, outstanding authority on the Sierra Nevada, did not live to write the book on the Yosemite Valley he had long planned, but his friend and co-worker, Dr. Fritiof Fryxell, carried out the work of assembling and arranging the best of Dr. Matthes' material on the Yosemite. *The Incomparable Valley* is a slender volume, but it contains the essence of Dr. Matthes' exhaustive monograph *Geologic History of the Yosemite Valley* (Professional Paper 160, U. S. Geological Survey), a classic in geologic literature. Dr. Fryxell has produced in new and very attractive form a book that will appeal to scientist and nature-lover alike; and he has achieved the aim "to interpret the Yosemite and the Sierra Nevada to all who love the mountains, particularly those who come to see and seeing, wonder and wish to understand." The unusually well organized content is presented in nine chapters which range in scope from the general aspects of the Sierra Nevada and the Yosemite Valley to detailed descriptions of the diversely sculptured walls, the domes, and those "chief ornaments of the Valley," the

leaping and cascading waterfalls. Many readers will find the final chapter "The Little Ice Age of Historic Times" particularly interesting and thought-provoking. Two physiographic maps and a series of dramatic photographs complete the survey of this world-famed valley. The book will serve as excellent guide book and reference for student and traveler; and it will be for the armchair naturalist an inspiring excursion, for here one finds landscape description and interpretation at its very best.

*University of California, Los Angeles* RUTH E. BAUGH

H. M. Kendall, R. M. Glendinning, and C. H. MacFadden. **Introduction to Geography,** Harcourt, Brace and Company, New York, 1951. xii and 752 pages, maps, illustrations, index. **$6.25.**

This new book is a welcome addition to the elementary textbook field on the college level. It is designed to meet the needs of a full year of introductory college geography. The first part of the book deals with Physical Geography, while the second includes Cultural Geography, both sections largely being treated systematically.

The most outstanding quality of this textbook is its clarity of expression, both in its prose and its illustrative material. The photographs, line sketches and maps, which are liberally used thruout the book, represent a new high in geography texts. The only exception to the consistently high quality of the illustrative material is the unfortunately poor register of the color plates.

The section on Cultural Geography appears to this reviewer to be superior to the section on Physical Geography in originality, in conformity with objectives, and in the presentation of basic concepts. The chapter dealing with Settlement Patterns is particularly worth commendation.

The section on Physical Geography is traditional in its treatment, is almost too elemental in its scope, and, as in so many texts in Physical Geography, seems to minimize basic analyses of pattern distributions for the inclusion of collated subject material.

The limitations of scale in the presentation of pattern distributions seems not to have been indicated clearly thruout the book. Generalization of patterns are of course necessary in any geographic study, but the scope and limitations of the generalizations should always be indicated, since pattern interpretations are directly related to them.

With all of its minor limitations, this textbook still stands as one of the leaders in its field and its flexibility is adaptable to a wide range of teacher interests and abilities.

*Harpur College, Endicott, New York* JOSEPH E. VAN RIPER

T. Walter Wallbank. **Man's Story: World History in its Geographic Setting.** Scott, Foresman and Co., Chicago, 1951. 768 pages. **$3.76.**

It is doubtless possible to write a text book which will synthesize geography and history, and if children are to study both, such a book is particularly desirable. This book, however, emphasizes the history at the expense of the geography. It is primarily a textbook of the history of civilization. As such it is a competent, well illustrated and well written book. Good use is made of historical maps, in which, however, are a number of small errors, and of period pieces, such as cartoons, paintings, sculpture. The geography appears in separate chapters, entitled "the Geographic Setting," scattered thru the book. These describe the stage on which the drama of history has been played. They are short but excellent studies, and avoid the temptation, so common in any work of simplification, of becoming deterministic. But the geographical side of this book is scarcely strong enough to allow the geographer to recommend it as a fair attempt to treat geography and history together. But as a history text it is a broad and liberal treatment and to be highly recommended.

NORMAN J. G. POUNDS

*Indiana University*

# BOOKS AND PAMPHLETS RECEIVED

M. Y. Nuttonson. **Agro-Climatological Series:** No. 10, "Ecological Crop Geography of Finland and Its Agro-Climatic Analogues in North America," 35 pages; No. 11, "Agricultural Climatology of Sweden and Its Agro-Climatic Analogues in North America," 27 pages; No. 12, "Ecological Crop Geography of Norway and Its Agro-Climatic Analogues in North America," 31 pages; and No. 13, "Agricultural Climatology of Siberia, Natural Belts, and Agro-Climatic Analogues in North America," 64 pages. American Institute of Crop Ecology, Washington, D.C., 1950. Charts and Maps.

Stephen B. Jones and Marion Fisher Murphy. **Geography and World Affairs.** Rand McNally & Company, Chicago, 1950. 398 pages, illustrations, index, atlas section.

**Adventures in Aviation Education.** H. E. Mehrens, Director and Editor. American Council on Education, Washington, 1951. xiv and 401 pages, 30 illustrations, bibliographies, index. $3.50.

Norman Carls, Frank E. Sorenson, Margery D. Howarth. **Neighbors in Latin America.** John C. Winston Company, Philadelphia, 1951. viii and 260 pages, illustrations, maps, charts, atlas, index.

J. Russell Smith and Frank E. Sorenson. **Neighbors in the United States and Canada.** John C. Winston Company, Philadelphia, 1951. viii and 350 pages, illustrations, maps, charts, atlas, index.

Harry W. Hazard. **Atlas of Islamic History.** Princeton University Press, Princeton, New Jersey, 1951, 49 pages, 20 maps with text, conversion tables for dates, index of place names. $4.

Alan M. Bateman. **The Formation of Mineral Deposits.** John Wiley & Sons, Inc., New York, 1951. xi and 371 pages, illustrations, geological time table, glossary, index. $5.50.

**Regionalism in America.** Merrill Jensen, editor. The University of Wisconsin Press, Madison, 1951. xvi and 425 pages. $6.50.

Peter Hood. **About Maps** (Puffin Picture Book Series). Penguin Books Ltd., Harmondsworth, Middlesex, England, 1950. 2 shillings.

Maud Esther Dilliard. **A Farm for Juliana.** E. P. Dutton & Co., Inc., New York, 1951. 189 pages, illustrations. $2.50.

A B. Guthrie, Jr. **The Big Sky** (juvenile edition). William Sloane Associates, Inc., New York, 1950. 340 pages, illustrations. $2.75.

Val Hart. **The Story of American Roads.** William Sloane Associates, Inc., New York, 1950. 243 pages, illustrations. $3.

Margaret Otto and Stuart Otto. **The Boat and Ship Book.** William Sloane Associates, Inc., New York, 1951. 64 pages, illustrations. $1.75.

Herbert Townsend. **Our Wonderful Earth.** Allyn and Bacon, Boston, 1950. 152 pages, illustrations.

**Panorama of Science** (Annual Supplement to the Smithsonian Series for 1951, compiled and edited by Webster Prentiss True). The Series Publishers, Inc., New York, 1951. 416 pages, illustrations.

**Hammond's Collegiate Atlas.** C. S. Hammond and Company, New York, 1950. $2.50.

Donald D. Brand. **Quiroga: A Mexican Municipio** (Smithsonian Institution,, Institute of Social Anthropology, Publication No. 11). U.S. Government Printing Office, Washington, D.C., 1951. 242 pages, 4 maps, tables, charts, 35 pages of photographs. $1.75.

# INDEX TO VOLUME L, 1951


**Ackerman,** Edward A. and J. Russell Whitaker, American Resources, Floyd F. Cunningham (A Review), 308

**Aitchison,** Alison E., Islands of the Western Pacific, Winnifred Lewis (A Review), 174

**Alaskan** Problems and Potentials, Kirk H. Stone, 177

**Aleutians,** The Geopolitics of the, Joseph S. Roucek, 24

**Amann,** William F., An Early German Geography Book, 123

**American** Association of School Administrators, Twenty-ninth Yearbook, Conservation Education in American Schools, Otis W. Freeman (A Review), 390

**An** Appreciation of the Puerto Ricans, Luella N. Dambaugh, 58

**Anderzohn,** Mamie L., Elementary Teachers Guide to Free Curriculum Materials, John Guy Fowlkes, Ann Meyers and Paul T. Cody (A Review), 175

**An** Early German Geography Book, William F. Amann, 123

**Appreciation** of George J. Miller, In, 216

**Areal** Patterns, A Technique for Visual Examination of Associations of, Allen K. Philbrick and Harold M. Mayer, 367

**Asa,** Jessie, Maps and Slow-Learners, 145

**Associations** of Areal Patterns, A Technique for Visual Examination, Allen K. Philbrick and Harold M. Mayer, 367

**Barton,** Thomas Frank, Inexpensive Teaching Aids, 232

**Basic** Geographic Learnings at Secondary School Levels, Ruby M. Junge, 158

**Baugh,** Ruth E., The Incomparable Valley: A Geologic Interpretation of the Yosemite, François E. Matthes (A Review), 390

**Becht,** J. Edwin, "Turning Tows" on the Illinois-Mississippi Waterways, 353

**Beck,** James R., The Global Distribution of Primary Governmental Types, 114

**Bedier,** Sister M. Juliana, Frederick K. Branon and Helen M. Ganey, My World of Neighbors, Sister M. Hermana Oppreicht (A Review), 172

———, Frederick K. Branon and Helen M. Ganey, North American Neighbors, Sister M. Hermana Oppreicht (A Review), 172

**Beef** Cattle Industry of Florida, Distribution and Development of the, H. O. Lathrop, 133

**Bengtson,** Nels A., Marine Geology, Ph. H. Kuenen (A Review), 88

———, Petroleum in Relation to Current Problems—II. Canada's Increasing Prominence in the Petroleum Industry, 103

———, World Geography of Petroleum, Wallace E. Pratt and Dorothy Good (A Review), 304

**Black,** John Donald, The Rural Economy of New England, Trevor Lloyd (A Review), 261

**Blanchard,** W. O., The Narrow Seas, 221

**Books** and Pamphlets Received, 264, 351, 392

**Branon,** Frederick K., Sister M. Juliana Bedier and Helen M. Ganey, My World of Neighbors, Sister M. Hermana Oppreicht (A Review), 172

———, Sister M. Juliana Bedier and Helen M. Ganey, North American Neighbors, Sister M. Hermana Oppreicht (A Review), 172

**Britain's** Groundnut Scheme in East Africa, Benjamin F. Richason, Jr., 150

**Brockmyer,** Irene, Testing with Pictures, 54

**Brown,** Robert Harold, Some Aspects of College Geography Pre-Tests, 210

**Bryan,** P. W. and Ll. Rodwell Jones, North America: An Historical, Economic and Regional Geography, Charles C. Colby (A Review), 173

**Calef,** Wesley, Student Mapping of an Area of Multi-Story Buildings, 233

**Canada's** Increasing Prominence in the Petroleum Industry, Petroleum in Relation to Current Problems—II., Nels A. Bengtson, 103

**Canet,** Gerado, Atlas de Cuba, Jack C. Ransome (A Review), 174

**Carson,** Rachel, The Sea Around Us, Ina Cullom Robertson (A Review), 306

**Clark,** Elizabeth and Charlotte Lawson, Specifications of Visual Materials in a Fifth Grade, 277

**Classical** Greek Trade, The Range of, Roderick Peattie, 383

**Cody,** Paul T., John Guy Fowlkes and Ann Meyers, Elementary Teachers Guide to Free Curriculum Materials, Mamie L. Anderzhon (A Review), 175

**Colby,** Charles C., North America: An Historical, Economic and Regional Geography, Ll. Rodwell Jones and P. W. Bryan (A Review), 173

**College** Geography Pre-Tests, Some Aspects of, Robert Harold Brown, 210

**Conoyer,** John W., There's Geography in a Country Churchyard, 192

**Contour** Lines, An Instrument and

Method of Teaching, James W. Hamilton, 230
**Cooper,** Edward L., John L. Rowe and G. Morell York, World Economic Geography, Arthur W. Watterson (A Review), 173
**Correspondence,** Learning Thru International, Robert E. Cramer, 288
**Course** of Study—Grades 7 to 12, Pennsylvania's Geography, Mary Viola Phillips, 323
**Cramer,** Robert E., Learning Thru International Correspondence, 288
**Cultural** Changes on the Island of Nauru, Recent, Graham H. Lawton, 12
**Cunningham,** Floyd F., American Resources, J. Russell Whitaker and Edward A. Ackerman (A Review), 308
**Current** Problems,—II. Canada's Increasing Prominence in the Petroleum Industry, Petroleum in Relation to, Nels A. Bengtson, 103
**Dambaugh,** Luella N., An Appreciation of the Puerto Ricans, 58
———, Puerto Rico's Ambition, 89
**Diffor,** John W. and Mary Foley Horkheimer, Educators Guide to Free Films, Elizabeth Eiselen (A Review), 87
———, and Mary Foley Horkheimer, Educators Guide to Free Slidefilms, Elizabeth Eiselen (A Review), 87
**Direction** in the Second Grade, A Study of, Jean Summers Kelley, 317
**Distinguished** Service Award in Geographic Education, Vernor C. Finch Receives the, 39
**Drake,** N. D'Arcy and Stewart Schackne, Oil for the World, Clare Symonds (A Review), 307
**Dulles,** John Foster, War or Peace, Edna E. Eisen (A Review), 304
**Durand,** Loyal, Jr., The National Council at Work, 43, 86
**East Africa,** Britain's Groundnut Scheme in, Benjamin F. Richason, Jr., 150
**Economic** Geography, Realism in Teaching, M. Ogden Phillips, 34
**Editorial** Notes and News, 255, 260, 302
**Educational** Land Use, The Geographer's Role in, Paul Vouras, 284
**Eiselen,** Elizabeth, Educators Guide to Free Films, John W. Diffor and Mary Foley Horkheimer (A Review), 87
———, Educators Guide to Free Slidefilms, John W. Diffor and Mary Foley Horkheimer (A Review), 87
**Eisen,** Edna E., The Geography of Education, 374
——— War or Peace, John Foster Dulles (A Review) 304
**Elementary** Geography, Learning Readiness in, George T. Renner, 65
——— School Geography?, Whither, J. D. McAulay, 189
——— School, Teaching Conservation in the, James M. Sanders, 99
**Espenshade,** Edward B., Jr., Mathematical Scale Problems, 107
**Fifth** Grade, Specifications of Visual Materials in a, Charlotte Lawson and Elizabeth Clark, 277
**Finch,** Vernor C., Receives the Distinguished Service Award in Geographic Education, 39
**Fine,** Benjamin, Geography Almost Ignored in Colleges, Survey Shows, 165
———, U. S. College Students "Flunk" in Knowledge of Geography, 334
**Florida,** Distribution and Development of the Beef Cattle Industry of, H. O. Lathrop, 133
**"Flunk"** in Knowledge of Geography, U. S. College Students, Benjamin Fine, 334
**Forestry** in Transition, New Zealand, Theo L. Hills, 265
**Fowlkes,** John Guy, Ann Meyers and Paul T. Cody, Elementary Teachers Guide to Free Curriculum Materials, Mamie L. Anderzhon (A Review), 175
**Frank,** Bernard and Anthony Netboy, Water, Land and People, Roderick Peattie (A Review), 44
**Freeman,** Otis W., Better Living Thru Wise Use of Resources, Halene Hatcher (A Review), 88
———, Conservation Education in American Schools, Twenty-ninth Yearbook, American Association of School Administrators (A Review), 390
———, Geography Among the Sciences, 202
———, Three Pacific Northwest Dams, 75
**Freeman,** T. W., Ireland, Its Physical, Historical, Social and Economic Geography, Eugene Van Cleef (A Review), 261
**Ganey,** Helen M., Frederick K. Branon and Sister M. Juliana Bedier, My World of Neighbors, Sister M. Hermana Oppreicht (A Review), 172
———, Frederick K. Branon and Sister M. Juliana Bedier, North American Neighbors, Sister M. Hermana Oppreicht (A Review), 172
**General** Education, Oceanography in, Aubrey Haan, 294
**Geographer's** Role in Educational Land Use, The, Paul Vouras, 284
**Geographic** Learnings at Secondary School Levels, Basic, Ruby M. Junge, 158
**Geographical** Publications, 44, 87, 129, 131, 172, 217, 219, 261, 304, 349, 390
**Geography** Almost Ignored in Colleges, Survey Shows, Benjamin Fine, 165

——, Among the Sciences, Otis W. Freeman, 202
—— **Book,** An Early German, William F. Amann, 123
—— in a Country Churchyard, There's, John W. Conoyer, 192
—— of Education, The, Edna E. Eisen, 374
—— in the High Schools of Michigan, Ruby M. Junge, 329
—— in the Junior Colleges of the United States, Benjamin F. Richason, Jr., 246
—— and the Past, Fred Kniffen, 126
**Geopolitics** of the Aleutians, The, Joseph S. Roucek, 24
—— of Greenland, The, Joseph S. Roucek, 239
**Glendinning,** R. M., H. M. Kendall and C. H. MacFadden, Introduction to Geography, Joseph E. Van Riper (A Review), 391
**Global** Distribution of Primary Governmental Types, The, James R. Beck, 114
**Good,** Dorothy and Wallace E. Pratt, World Geography of Petroleum, Nels A. Bengtson (A Review), 304
**Grades** 7 to 12, Pennsylvania's Geography Course of Study, Mary Viola Phillips, 323
**Greenland,** The Geopolitics of, Joseph S. Roucek, 239
**Gregor,** Howard F., Physical Geography, Philip Lake (A Review), 44
**Groundnut** Scheme in East Africa, Britain's, Benjamin F. Richason, Jr., 150
**Gueffroy,** Edna M., Harry O. Lathrop, 1888-1951, 256
**Haan,** Aubrey, Oceanography in General Education, 294
**Hamilton,** James W., An Instrument and Method of Teaching Contour Lines, 230
**Harbeson,** Cordelia, Intermediate Geography: A Reading Problem, 21
**Harris,** Ruby, Neighbors on Our Earth, Latin America and the Mediterranean, Gertrude Whipple and Preston E. James (A Review), 131
**Hatcher,** Halene, Better Living Thru Wise Use of Resources, Otis W. Freeman (A Review), 88
**Heintz,** Anatol, Svalbard, A Norwegian Outpost, Johannes Reumert (A Review), 350
**Heyerdahl,** Thor, Kon-Tiki, Earl B. Shaw (A Review), 176
**High** Schools of Michigan, Geography in the, Ruby M. Junge, 329
**Hills,** Theo L., New Zealand Forestry in Transition, 265
**Horkheimer,** Mary Foley and John W. Diffor, Educators Guide to Free Films, Elizabeth Eiselen (A Review), 87
——, and John W. Diffor, Educators Guide to Free Slidefilms, Elizabeth Eiselen (A Review), 87
**Huancayo** and Its Famous Indian Market in the Peruvian Andes, C. Langdon White, 1
**Hypothetical** Maps, The Teaching of, Linnie B. James, 361
**Illinois-Mississippi** Waterway, "Turning Tows" on the, J. Edwin Becht, 353
**Indian** Market in the Peruvian Andes, Huancayo and Its Famous, C. Langdon White, 1
**Inexpensive** Teaching Aids, Thomas Frank Barton, 232
**Instrument** and Method of Teaching Contour Lines, An, James W. Hamilton, 230
**Intermediate** Geography: A Reading Problem, Cordelia Harbeson, 21
**International** Correspondence, Learning Thru, Robert E. Cramer, 288
**Irwin,** Dorothy and William Irwin, Australia and New Zealand, Ina Cullom Robertson (A Review), 219
**Island** of Nauru, Recent Cultural Changes on the, Graham H. Lawton, 12
**James,** Linnie B., The Teaching of Hypothetical Maps, 361
**James,** Preston E. and Gertrude Whipple, Eurasia and the Modern World, Anna C. Larson (A Review), 349
——, Latin America, Henry J. Warman (A Review), 129
——, and Gertrude Whipple, Neighbors on Our Earth, Latin America and the Mediterranean, Ruby Harris (A Review), 131
**Jones,** Ll. Rodwell and **P. W. Bryan,** North America: An Historical, Economic and Regional Geography, Charles C. Colby (A Review), 173
**Junge,** Ruby M., Basic Geographic Learnings at Secondary School Levels, 158
——, Geography in the High Schools of Michigan, 329
**Junior** Colleges of the United States, Geography in the, Benjamin F. Richason, Jr., 246
**Kelley,** Jean Summers, A Study of Direction in the Second Grade, 317
**Kendall,** H. M., R. M. Glendinning and C. H. MacFadden, Introduction to Geography, Joseph E. Van Riper (A Review), 391
**Kimble,** George H. T., The Role of Geography at the Mid-Century, 45
**Kniffen,** Fred, Geography and the Past, 126
**Kohn,** Clyde F., National Council at Work, 257, 348, 389

**Kuenen,** Ph. H., Marine Geology, Nels A. Bengtson (A Review), 88
**Lake,** Philip, Physical Geography, Howard F. Gregor (A Review), 44
**Landy,** Dorothy, Need Content Be Sacrificed?, 321
**Larson,** Anna C., Eurasia and the Modern World, Gertrude Whipple and Preston E. James (A Review), 349
**Latendress,** Hazel, A Geography Project for Upper Grade Level, 10
**Lathrop,** 1888-1951, Harry O., Edna M. Gueffroy, 256
**Lathrop,** H. O., Conservation of Natural Resources, Guy-Harold Smith (A Review), 262
———, Distribution and Development of the Beef Cattle Industry of Florida, 133
———, National Council at Work, 130, 171, 218
**Lawson,** Charlotte, and Elizabeth Clark, Specifications of Visual Materials in a Fifth Grade, 277
**Lawton,** Graham H., Recent Cultural Changes on the Island of Nauru, 12
**Learning** Readiness in Elementary Geography, George T. Renner, 65
——— Thru International Correspondence, Robert E. Cramer, 288
**Lewis,** Winnifred, Islands of the Western Pacific, Alison E. Aitchison (A Review), 174
**Lloyd,** Trevor, The Rural Economy of New England, John Donald Black (A Review), 261
**McAulay,** J. D., Whither Elementary School Geography?, 189
**MacFadden,** C. H., H. M. Kendall and R. M. Glendinning, Introduction to Geography, Joseph E. Van Riper (A Review), 391
**Maps** and Slow-Learners, Jessie Asa, 145
**Mathematical** Scale Problems, Edward B. Espenshade, jr., 107
**Mather,** K. F., C. J. Roy and L. R. Thiesmeyer, A Laboratory Manual for Geology, Part I, Physical Geology, Louis C. Peltier (A Review), 175
**Matthes,** François E., The Incomparable Valley: A Geologic Interpretation of the Yosemite, Ruth E. Baugh (A Review), 390
**Mayer,** Harold M. and Allen K. Philbrick, A Technique for Visual Examination of Associations of Areal Patterns, 267
**Mercator** Grid: Its Practical and Pedagogic Merits, Clarence L. Vinge, 30
**Method** of Teaching Contour Lines, An Instrument and, James W. Hamilton, 230
**Meyers,** Ann, John Guy Fowlkes and Paul T. Cody, Elementary Teachers Guide to Free Curriculum Materials, Mamie L. Anderzhon (A Review), 175
**Michigan,** Geography in the High Schools of, Ruby M. Junge, 329
**Mid-Century,** The Role of Geography at the, George H. T. Kimble, 45
**Miller,** In Appreciation of George J., 216
**Möre** og Romsdal County, Norway: Population Distribution, Lawrence M. Sommers, 309
**Multi-Story** Buildings, Student Mapping of an Area of, Wesley Calef, 233
**Narrow** Seas, The, W. O. Blanchard, 221
**National** Council at Work, The, 43, 86, 130, 171, 218, 257, 303, 348, 389
**Need** Content be Sacrificed?, Dorothy Landy, 321
**Netboy,** Anthony and Bernard Frank, Water, Land and People, Roderick Peattie (A Review), 44
**New Zealand** Forestry in Transition, Theo L. Hills, 265
**Nielson,** A. M., Economic and Industrial Geography, Joseph E. Williams (A Review) 131
**Norway:** Population Distribution, Möre og Romsdal County, Lawrence M. Sommers, 309
**Oceanography** in General Education, Aubrey Haan, 294
**Oppreicht,** Sister M. Hermana, My World of Neighbors, Frederick K. Branon, Sister M. Juliana Bedier and Helen M. Ganey (A Review), 172
———, North American Neighbors, Frederick K. Branon, Sister M. Juliana Bedier and Helen M. Ganey (A Review), 172
**Ormsby,** H., France: A Regional and Economic Geography, Norman J. G. Pounds (A Review), 305
**Pacific** Northwest Dams, Three, Otis W. Freeman, 75
**Peattie,** Roderick, The Range of Classical Greek Trade, 383
———, The Teaching of Geography: A Dynamic Approach, Zoe A. Thralls (A Review), 132
———, Water, Land and People, Bernard Frank and Anthony Netboy (A Review), 44
**Pedogogic** Merits, Mercator Grid: Its Practical and, Clarence L. Vinge, 30
**Peltier,** Louis C., A Laboratory Manual for Geology, Part I, Physical Geology, K. F. Mather, C. J. Roy and L. R. Thiesmeyer (A Review), 175
**Pennsylvania's** Geography Course of Study—Grades 7 to 12, Mary Viola Phillips, 323
**Peruvian** Andes, Huancayo and Its Famous Indian Market in the, C. Langdon White, 1

**Petroleum** Industry, Petroleum in Relation to Current Problems—II. Canada's Increasing Prominence in the, Nels A. Bengtson, 103
——— in Relation to Current Problems —II. Canada's Increasing Prominence in the Petroleum Industry, Nels A. Bengtson, 103
**Philbrick,** Allen K. and Harold M. Mayer, A Technique for Visual Examination of Associations of Areal Patterns, 367
**Phillips,** M. Ogden, Realism in Teaching Economic Geography, 34
**Phillips,** Mary Viola, Pennsylvania's Geography Course of Study—Grades 7 to 12, 323
**Pictures,** Testing with, Irene Brockmyer, 54
**Population** Distribution, Möre og Romsdal County, Norway, Lawrence M. Sommers, 309
**Pounds,** Norman J. G., France: A Regional and Economic Geography, H. Ormsby (A Review), 305
———, Man's Story: World History in its Geographic Setting, T. Walter Wallbank (A Review), 391
**Pratt,** Wallace E. and Dorothy Good, World Geography of Petroleum, Nels A. Bengtson (A Review), 304
**Pre-Tests,** Some Aspects of College Geography, Robert Harold Brown, 210
**Primary** Governmental Types, The Global Distribution of, James R. Beck, 114
**Prizes,** Journal of Geography, 41
**Problems,** Mathematical Scale, Edward B. Espenshade, Jr., 107
**Project** for Upper Grade Level, A Geography, Hazel Latendress, 10
**Puerto Ricans,** An Appreciation of the, Luella N. Dambaugh, 58
**Puerto Rico's** Ambition, Luella N. Dambaugh, 89
**Range** of Classical Greek Trade, The, Roderick Peattie, 383
**Ransome,** Jack C., Atlas de Cuba, Gerado Canet (A Review), 174
**Reading** Problem, Intermediate Geography: A, Cordelia Harbeson, 21
**Realism** in Teaching Economic Geography, M. Ogden Phillips, 34
**Renner,** George T., Learning Readiness in Elementary Geography, 65
**Report** of the Thirty-Sixth Meeting of the NCGT, M. Melvina Svec, 82
**Reumert,** Johannes, Svalbard, A Norwegian Outpost, Anatol Heintz (A Review), 350
**Rhynsburger,** Willert, U. S. Railroads, Classified According to Capacity and Relative Importance—A Map, Edward L. Ullman (A Review), 263
**Richason,** Benjamin F., Jr., Britain's Groundnut Scheme in East Africa, 150
———, Geography in the Junior Colleges of the United States, 246
**Robertson,** Ina Cullom, Australia and New Zealand, William and Dorothy Irwin (A Review), 219
———, Great Britain and Canada, Mary Russell (A Review), 219
———, The Sea Around Us, Rachel Carson (A Review), 306
**Role** of Geography at the Mid-Century, The, George H. T. Kimble, 45
**Roucek,** Joseph S., The Geopolitics of the Aleutians, 24
———, The Geopolitics of Greenland, 239
**Rowe,** John L., G. Morell York and Edward L. Cooper, World Economic Geography, Arthur W. Watterson (A Review), 173
**Roy,** C. J., K. F. Mather, and L. R. Thiesmeyer, A Laboratory Manual for Geology, Part I, Physical Geology, Louis C. Peltier (A Review), 175
**Russell,** Mary, Great Britain and Canada, Ina Cullom Robertson (A Review), 219
**Sanders,** James M., Teaching Conservation in the Elementary School, 99
**Schackne,** Stewart and N. D'Arcy Drake, Oil for the World, Clare Symonds (A Review), 307
**Sciences,** Geography Among the, Otis W. Freeman, 202
**Seas,** The Narrow, W. O. Blanchard, 221
**Second** Grade, A Study of Direction in the, Jean Summers Kelley, 317
**Secondary** School Levels, Basic Geographic Learnings at, Ruby M. Junge, 158
**Schackleton,** M. R., Europe: A Regional Geography, Eugene Van Cleef (A Review), 306
**Shaw,** Earl B., Kon-Tiki, Thor Heyerdahl (A Review), 176
———, The World: A General Geography, L. Dudley Stamp (A Review), 217
**Slow-Learners,** Maps and, Jessie Asa, 145
**Smith,** Guy-Harold, Conservation of Natural Resources, H. O. Lathrop (A Review), 262
**Sommers,** Lawrence M., Möre og Romsdal County, Norway: Population Distribution, 309
**Stamp,** L. Dudley, The World: A General Geography, Earl B. Shaw (A Review), 217
**Stone,** Kirk H., Alaskan Problems and Potentials, 177
**Student** Mapping of an Area of Multi-Story Buildings, Wesley Calef, 233

**Study** of Direction in the Second Grade, A, Jean Summers Kelley, 317
**Svec,** M. Melvina, National Council at Work, 303
———, Report of the Thirty-Sixth Meeting of the NCGT, 82
**Symonds,** Clare, Oil for the World, Stewart Schackne and N. D'Arcy Drake (A Review), 307
**Teaching** Aids, Inexpensive, Thomas Frank Barton, 232
——— Conservation in the Elementary School, James M. Sanders, 99
——— of Hypothetical Maps, The, Linnie B. James, 361
**Technique** for Visual Examination of Associations of Areal Patterns, A, Allen K. Philbrick and Harold M. Mayer, 367
**Testing** with Pictures, Irene Brockmyer, 54
**Thiesmeyer,** L. R., C. J. Roy and K. F. Mather, A Laboratory Manual for Geology, Part I, Physical Geology, Louis C. Peltier (A Review), 175
**Thompson,** Dorothy Tostlebe, Two Eskimo Geographers, 342
**Thralls,** Zoe A., The Teaching of Geography: A Dynamic Approach, Roderick Peattie (A Review), 132
**Three** Pacific Northwest Dams, Otis W. Freeman, 75
**Trade,** The Range of Classical Greek, Roderick Peattie, 383
**"Turning Tows"** on the Illinois-Mississippi Waterway, J. Edwin Becht, 353
**Two** Eskimo Geographers, Dorothy Tostlebe Thompson, 342
**Ullman,** Edward L., U. S. Railroads, Classified According to Capacity and Relative Importance—A Map, Willert Rhynsburger (A Review), 263
**U. S.** College Students "Flunk" in Knowledge of Geography, Benjamin Fine, 334
**United States,** Geography in the Junior Colleges of the, Benjamin F. Richason, Jr., 246
**Upper** Grade Level, A Geography Project for, Hazel Latendress, 10
**Van Cleef,** Eugene, Europe: A Regional Geography, M. R. Shackleton (A Review), 306
———, Ireland, Its Physical, Historical, Social and Economic Geography, T. W. Freeman (A Review), 261
**Van Riper,** Joseph E., Introduction to Geography, H. M. Kendall, R. M. Glendinning and C. H. MacFadden (A Review), 391
**Vinge,** Clarence L., Mercator Grid: Its Practical and Pedagogic Merits, 30
**Visual** Examination of Associations of Areal Patterns, A Technique for, Allen K. Philbrick and Harold M. Mayer, 367
——— Materials in a Fifth Grade, Specifications of, Charlotte Lawson and Elizabeth Clark, 277
**Vouras,** Paul, The Geographer's Role in Educational Land Use, 284
**Wallbank,** T. Walter, Man's Story: World History in its Geographic Setting, Norman J. G. Pounds (A Review), 391
**Warman,** Henry J., Latin America, Preston E. James (A Review), 129
**Watterson,** Arthur W., World Economic Geography, G. Morell York, John L. Rowe and Edward L. Cooper (A Review), 173
**Whipple,** Gertrude and Preston E. James, Eurasia and the Modern World, Anna C. Larson (A Review), 349
———, and Preston E. James, Neighbors on Our Earth, Latin America and the Mediterranean, Ruby Harris (A Review), 131
**Whitaker,** J. Russell and Edward A. Ackerman, American Resources, Floyd F. Cunningham (A Review), 308
**White,** C. Langdon, Huancayo and Its Famous Indian Market in the Peruvian Andes, 1
**Williams,** Joseph E., Economic and Industrial Geography, A. M. Nielson (A Review), 131
**York,** G. Morell, John L. Rowe and Edward L. Cooper, World Economic Geography, Arthur W. Watterson (A Review), 173

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According to Steelways Magazine, taconite rather than high grade ores in Labrador and Venezuela may be our principal source of steel in the future in spite of the fact that taconite is an extremely hard rock and contains only about 25 per cent iron.

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It is reported that snow-houses used by some Eskimos can be kept at an inside temperature of 40 to 60 degrees Fahrenheit without melting if air outside is cold enough to neutralize the warmth within.

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The catalogue of the International Film Bureau contains several hundred titles of films which should be of interest to teachers. Copies of the catalogue will be sent without charge to classroom teachers who write to the Bureau at 6 North Michigan Avenue, Chicago 2, Illinois.

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